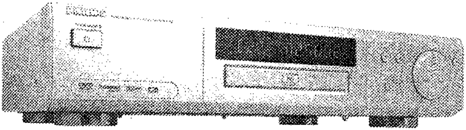
DVD-Video Player

SACD 900

DVD962SA /001 /171 /691
SACD900 /171

Service
Service
Service



CL 16532136_000.eps
051101

Service Manual

CLASS 1
LASER PRODUCT

	Contents		Page	
1	Technical Specs and Connection Facilities		2	
2	Safety Instructions, Warnings, Notes, and Service Hints		3	
3	Directions for Use		6	
4	Mechanical- and Dismantling Instructions		20	
5	Diagnostic Software, Trouble Shooting and Test Instructions		22	
6	*Wiring-, Block Diagrams and Testpoint Overviews*			
	Wiring Diagram		53	
	Block Diagram (General)		54	
	Testpoint Overview AV Board		55	
	Testpoint Overview Mono Board		56-58	
7	*Electrical Diagrams and Print-Layouts*		*Diagram*	*PWB*
	Power Supply Unit		59	60-61
	AV Board: Sys Clk & Contol	(Diagram A1)	62	69-74
	AV Board: Diversity Tables	(A1, A3, A5)	63	69-74
	AV Board: DAC	(Diagram A2)	64	69-74
	AV Board: Audio 1	(Diagram A3)	65	69-74
	AV Board: Audio 2	(Diagram A4)	66	69-74
	AV Board: Video & SCART	(Diagram A5)	67	69-74
	AV Board: Digital YUV	(Diagram A6)	68	69-74
	Display Panel	(Diagram D)	75	76-78
	P-Scan Board: Line Doubler	(Diagram P1)	79	82-83
	P-Scan Board: High Quality YUV	(Diagram P2)	80	82-83
	P-Scan Board: Encoder	(Diagram P1)	81	82-83
	Standby Board	(Diagram S)	84	84
	Mono Brd: DVD ALAS	(Diagram 1)	85	95-102
	Mono Brd: MACE Controller	(Diagram 2)	86	95-102
	Mono Brd: CD-DVD Decoder	(Diagram 3)	87	95-102
	Mono Brd: Program Memories	(Diagram 4)	88	95-102
	Mono Brd: CPU & MPEG Dec.	(Diagram 5)	89	95-102
	Mono Brd: Pwr Supply & Outp. Int.	(Diagram 6)	90	95-102
	Mono Brd: SDRAM's	(Diagram 7)	91	95-102
	Mono Brd: SACD Decoder	(Diagram 8)	92	95-102
	Mono Brd: System Clocks	(Diagram 9)	93	95-102
	Mono Brd: DAC Interface	(Diagram 10)	94	95-102
8	Alignments (Not Available)		103	
9	Circuit-, IC Descriptions, and		103	
	List of Abbreviations		146	
10	Spare Parts List		147	

©Copyright 2001 Philips Consumer Electronics B.V. Eindhoven, The Netherlands. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise without the prior permission of Philips.

Published by MW 0171 Service PaCE

Subject to modification GB 3122 785 11570

PHILIPS

1. Technical Specifications & Connection Facilities

Specifications

PLAYBACK SYSTEM

SACD Stereo
SACD multi-channel
DVD Video
Video CD
S-Video CD
CD (CD-R and CD-RW)
DVD+RW and DVD-R

OPTICAL READOUT SYSTEM

Lasertype	Semiconductor AlGaAs
Numerical Aperture	0.60 (DVD) 0.45 (VCD/CD)
Wavelength	650 nm (DVD) 780 nm (VCD/CD)

SACD DISC FORMAT

Medium	Optical Disc	
Diameter	12cm (8 cm)	
DVD DISC FORMAT		
Medium	Optical Disc	
Diameter	12cm (8 cm)	
Playing time (12 cm)	One layer	2.15 h
	Dual layer	4 h
	Two side, single layer	4.30 h
	Two side, dual layer	8 h

TV STANDARD	EUROPE	USA
	(PAL/50Hz)	(NTSC/60Hz)
Number of lines	625	525
Playback	Multi standard	(PAL/NTSC)

AUDIO FORMAT

Digital	DSD	Uncompressed Digital
	MPEG	Compressed Digital
	DTS/Dolby Digital	
	PCM	16, 20, 24 bits fs, 44.1, 48, 96 kHz

Analog Sound Stereo
Dolby Surround-compatible downmix from multi-channel sound
Full decoding of Dolby Digital multi-channel surround sound
3D Sound (TruSurround) for virtual 5.1 channel sound on 2 speakers

VIDEO FORMAT

Digital Compression	MPEG2 for DVD. MPEG1 for VCD	
DVD	50 Hz	60 Hz
Horiz. resolution	720 pixels	720 pixels
Vertical resolution	576 lines	480 lines
VCD	50 Hz	60 Hz
Horiz. resolution	352 pixels	352 pixels
Vertical resolution	288 lines	240 lines

SACD AUDIO PERFORMANCE

DA Converter		DSD
SACD	fs 2.8224 MHz	DC - 100 kHz
Max. output voltage (0dB)		2 V rms
Channel unbalance		< 0.5 dB
Cut-off frequency		
Front L/R, Stereo		50 kHz
Surr. L/R, Center		40 kHz
Signal-Noise (1kHz)		110 dB
Total harmonic distortion (1kHz)		100 dB
Dynamic Range (1kHz)		105 dB
Crosstalk (1kHz)		110 dB

VIDEO PERFORMANCE

Video output	1 Vpp into 75 ohm
S-Video output	Y: 1 Vpp into 75 ohm C: 0.3 Vpp into 75 ohm
Y Pr/Cr Pb/Cb output	Y: 1 Vpp into 75 ohm Pr/Cr Pb/Cb: 0.7 Vpp into 75 ohm
Black Level Shift	On/Off
Video Shift	Left/Right

AUDIO PERFORMANCE (TYPICAL)

DA Converter	24 bits	
DVD	fs 96 kHz	4 Hz - 44 kHz
	fs 48 kHz	4 Hz - 22 kHz
Video CD	fs 48 kHz	4 Hz - 22 kHz
CD	fs 44.1 kHz	4 Hz - 20 kHz
Signal-Noise (1kHz)		< 100 dB
Dynamic Range (1kHz)		< 95 dB
Crosstalk (1kHz)		< 105 dB
Distortion and Noise (1kHz)		< 92 dB

CONNECTIONS

Y Pr/Cr Pb/Cb output (480p)	Cinch 3x (green, blue, red)
Y Pr/Cr Pb/Cb output (480i)	Cinch 3x (green, blue, red)
S-Video output	Mini DIN, 4 pins
Video output	Cinch (yellow) 2x
Audio L+R output	Cinch (white/red)
6 Channel analog output	
Audio Front Left/Right	Cinch (white/red)
Audio Surr. Left/Right	Cinch (white/red)
Audio Centre	Cinch (blue)
Audio Subwoofer	Cinch (black)
Digital Audio Output	1 coaxial, 1 optical IEC958 for CDDA/LPCM IEC1937 for MPEG1/2, Dolby Digital, DTS

POWER SUPPLY (UNIVERSAL)

Power inlet	110-240V, 50/60Hz
Power usage	Approx. 30 Watt
Power usage standby	less than 4 Watt

CABINET

Dimensions	435 x 100 x 321 mm (w x h x d)
Weight	approx. 4.2 kg

PACKAGE CONTENTS

SACD player
AC power cord
Remote Control with batteries
Audio/Video cables
CVBS Video cable
Instructions for use

* *typical playing time for movie with 2 spoken languages and 3 subtitle languages*

Specifications subject to change without prior notice

2. Safety Instructions, Warnings, Notes, and Service Hints

2.1 Safety Instructions

2.1.1 General Safety

Safety regulations require that during a repair:
- Connect the unit to the mains via an isolation transformer.
- Replace safety components, indicated by the symbol ⚠, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that after a repair, you must return the unit in its original condition. Pay, in particular, attention to the following points:
- Route the wires/cables correctly, and fix them with the mounted cable clamps.
- Check the insulation of the mains lead for external damage.
- Check the electrical DC resistance between the mains plug and the secondary side:
  1. Unplug the mains cord, and connect a wire between the two pins of the mains plug.
  2. Set the mains switch to the 'on' position (keep the mains cord unplugged!).
  3. Measure the resistance value between the mains plug and the front panel, controls, and chassis bottom.
  4. Repair or correct unit when the resistance measurement is less than 1 MΩ.
  5. Verify this, before you return the unit to the customer/user (ref. UL-standard no. 1492).
  6. Switch the unit 'off', and remove the wire between the two pins of the mains plug.

2.1.2 Laser Safety

This unit employs a laser. Only qualified service personnel may remove the cover, or attempt to service this device (due to possible eye injury).

Laser Device Unit

Type	: Semiconductor laser GaAlAs
Wavelength	: 650 nm (DVD) : 780 nm (VCD/CD)
Output Power	: 20 mW (DVD+RW writing) : 0.8 mW (DVD reading) : 0.3 mW (VCD/CD reading)
Beam divergence	: 60 degree

CLASS 1
LASER PRODUCT

Figure 2-1

Note: Use of controls or adjustments or performance of procedure other than those specified herein, may result in hazardous radiation exposure. Avoid direct exposure to beam.

2.2 Warnings

2.2.1 General

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD, ⚠). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are at the same potential as the mass of the set by a wristband with resistance. Keep components and tools at this same potential.
  Available ESD protection equipment:
  - Complete kit ESD3 (small tablemat, wristband, connection box, extension cable and earth cable) 4822 310 10671.
  - Wristband tester 4822 344 13999.
- Be careful during measurements in the live voltage section. The primary side of the power supply (pos. 1005), including the heatsink, carries live mains voltage when you connect the player to the mains (even when the player is 'off'!). It is possible to touch copper tracks and/or components in this unshielded primary area, when you service the player. Service personnel must take precautions to prevent touching this area or components in this area. A 'lightning stroke' and a stripe-marked printing on the printed wiring board, indicate the primary side of the power supply.
- Never replace modules, or components, while the unit is 'on'.

2.2.2 Laser

- The use of optical instruments with this product, will increase eye hazard.
- Only qualified service personnel may remove the cover or attempt to service this device, due to possible eye injury.
- Repair handling should take place as much as possible with a disc loaded inside the player.
- Text below is placed inside the unit, on the laser cover shield:

CAUTION VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID EXPOSURE TO BEAM
ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING VED ÅBNING UNDGÅ UDSÆTTELSE FOR STRÅLING
ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGÅ EKSPONERING FOR STRÅLEN
VARNING SYNLIG OCH OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD BETRAKTA EJ STRÅLEN
VARO! AVATTAESSA OLET ALTTIINA NÄKYVÄLLE JA NÄKYMÄTTÖMÄLLE LASER SÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN
VORSICHT SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET NICHT DEM STRAHL AUSSETSEN
DANGER VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID DIRECT EXPOSURE TO BEAM
ATTENTION RAYONNEMENT LASER VISIBLE ET INVISIBLE EN CAS D'OUVERTURE EXPOSITION DANGEREUSE AU FAISCEAU

Figure 2-2

2.2.3 Notes

Dolby
Manufactered under licence from Dolby Laboratories. "Dolby", "Pro Logic" and the double-D symbol are trademarks of Dolby Laboratories. Confidential Unpublished Works.
©1992-1997 Dolby Laboratories, Inc. All rights reserved.

DOLBY SURROUND
PRO • LOGIC

Figure 2-3

Trusurround
TRUSURROUND, **SRS** and symbol (fig 2-4) are trademarks of SRS Labs. Inc. TRUSURROUND technology is manufactured under licence frm SRS labs, Inc.

Figure 2-4

Video Plus

"Video Plus+" and "PlusCode" are registered trademarks of the Gemstar Development Corporation. The "Video Plus+" system is manufactored under licence from the Gemstar Development Corporation.

VIDEOplus+®

Figure 2-5

Macrovision

This product incorporates copyright protection technology that is protected by method claims of certain U.S. patents and other intellectual property rights owned by Macrovision Corporation and other rights owners.
Use of this copyright protection technology must be autorized by Macrovision Corporation, and is intended for home and other limited viewing uses only unless otherwise authorized by Macrovision Corporation. Reverse engineering or disassembly is prohibited.

2.3 Service Hints

2.3.1 Switched Mode Power Supply 1005

This power supply unit has to be repaired down to component level in case of failure.

2.3.2 SACD Module

This module can be repaired as follows:

1. The loader and DVD-Mechanism (VAL6011) is one assembly. This assembly is a not repairable unit and must be exchanged completely in case of failure. A new unit can be ordered with codenumber 9305 023 61104.
2. The mono board has to be repaired down to component level. Repair handling of the monoboard requires a workshop with sophisticated desoldering tools.

2.3.3 ComPair

For assistance with the repair process of the monoboard an electronic fault finding guidance has been developed, this program is called ComPair.
This ComPair program is available on CDROM.
The version of the CDROM for repair of the monoboard is V1.3 or higher and can be ordered with codenumber: 4822 727 21637. This is an update CDROM, so when the ComPair CDROM is used for the first time, one has to install the ComPair Engine CDROM V1.2 first.
The V1.2 CDROM can be ordered with code number 4822 727 21634 and has to registered after instalation. The procedure for registration is explained in the help file of the program and in the CDROM booklet.
The cable to connect the monoboard with a PC can be ordered with codenumber: 3122 785 90017.
All the hardware and software requirements of the systems necessary for working with ComPair is described on the CDROM.

2.3.4 Service Positions

SACD Module

Refer to dismantling instructions for dismounting of the board. Figures 2-1 to 2-3 shows the service position that are recommended during repairing of the boards.

Mono Board

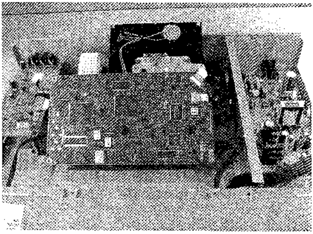


Figure 2-6

AV Board

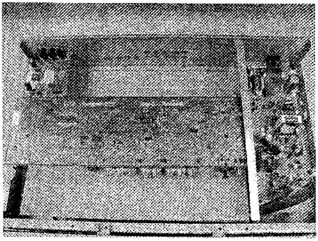


Figure 2-7

P-Scan Board

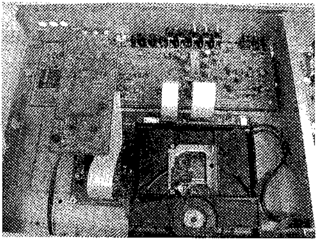


Figure 2-8

Introduction

Reality reproduced: Super Audio CD

The future in digital sound reproduction is no longer limited to a closely simulating of reality. The new audio standard IS reality! The human ear is no longer capable of distinguishing audible reality from digital reproduction. At Philips the future starts today with the Super Audio Compact Disc player. This Super Audio CD player combines superior sound quality with the possibility of playing almost all existing audio and video formats with a single player. Your precious CD collection retains its value!

The Super Audio standard is based on Direct Stream Digital (DSD) technology. This new direct-stream digital format comprises a 1-bit system that has a digital sampling frequency that is 64 times higher than that of conventional audio CD. The results are spectacular: a frequency response of over 50k Hz and a 120dB dynamic range over the entire audible spectrum. Mixed with as many of the original frequencies as possible, the audio information audible for human ears sounds much more natural. All audible frequencies are, after all, embedded in the frequency range as emitted by the sound source. A better reproduction does not exist! For the first time your ears will relive reality.

The next standard: hybrid disc

The Super Audio CD is the evolution of the CD that provides ultra-high-quality sound. Additional features, including multi-channel, can be offered. On the high density (HD) Super Audio CD you may have access to separate areas, containing two-channel stereo and multi-channel.

But that is not all! The hybrid version of the SACD guarantees backward compatibility with the installed base of CD and DVD players. In addition to the HD layer, the hybrid disc contains a standard density CD layer with conventional two-channel stereo CD audio information. The two layers are read from the same side of the disc. The HD layer is read by and DVD laser. The bottom reflective layer with conventional CD sound is read by the CD laser through the second, semi-transmissive HD layer.

SACD: reality in sound...and vision

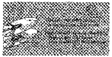
This SACD player will not only surprise you with its superior reproduction of almost all existing audio formats. Connected to your TV, your SACD player presents VCD and DVD-video information as perfect digital studio-quality images with truly 3-dimensional digital multi-channel audio. Story sequences can be screened from your own choice of camera angle. You can break down language barriers with sound tracks in as many as eight languages, plus - if available on disc - as many as 16 subtitling languages. Video becomes a new experience. That makes the SACD player an essential component in a state-of-the-art audio-video system.

Super Audio CD

You will recognize Super Audio CDs by the logo. There are three types of Super Audio CDs: single-layer, dual-layer and hybrid discs. Each type may contain two areas of recorded information: a High Quality Stereo area and a High Quality Multi-channel area.

- The single layer disc may contain both information areas.
- The dual layer disc may contain both information areas but a double amount of information can be stored on the disc thanks to the second layer.
- The hybrid disc may contain not only both information areas but also a second, standard CD layer, making it playable on standard CD players.

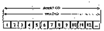
Recorded information may vary per area. This is indicated in the disc inlay. Areas can be selected separately before or during playback, while playing Super Audio CDs via the remote control or via the On-Screen Display on your TV.



SUPER AUDIO CD

Audio CD (CDDA)

Audio CDs contain music tracks only. You will recognise these CDs by their logo. You can play them in conventional style through a stereo system, using the keys on the remote control and/or front panel, or via the TV using the On-screen Display (OSD).



COMPACT disc DIGITAL AUDIO

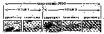
Note:
– The DTS audio format is only supported on DVD. This product does not support the playback of DTS encoded CDs.

Digital video

DVD-Video uses state-of-the-art MPEG 2 data compression technology to register an entire movie on a single 5-inch disc. DVD's variable bitrate compression, running at up to 9.8 Mbits/second, captures even the most complex images in their original quality.
The crystal-clear digital images have a horizontal resolution of over 500 lines, with 720 pixels (picture elements) to each line. The resolution is more than double that of VHS, superior to Laser Disc, and entirely comparable with digital masters made in recording studios.
DVD-Video discs conform to either the PAL or NTSC video standard. This dual-standard player can play both types, and presents them in the best possible way on your multi-standard TV screen.
As the universal video system of the future, DVD-Video offers optimal images on any TV screen.

DVD Video

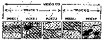
You will recognize DVD-Video discs by the logo. Depending on the material on the disc (a movie, video clips, a drama series, etc.), these discs may have one or more Titles, and each Title may have one or more Chapters. To make access easy and convenient, your player lets you move between Titles and between Chapters.



DVD VIDEO

Video CD

You will recognize Video CDs by the logo. Depending on the material on the disc (a movie, video clips, a drama series, etc.), these discs may have one or more tracks, and tracks may have one or more indexes, as indicated on the disc case. To make access easy and convenient, your player lets you move between tracks and between indexes.



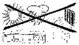
COMPACT disc DIGITAL VIDEO

Unpacking

First check and identify the contents of your SACD player package, as listed below:
- SACD player
- AC power cord
- Remote Control with batteries
- Audio/Video cables
- CVBS Video cable
- Instructions for use

If any item is damaged or missing, please inform your supplier immediately.
Save the packaging materials; you may need them to transport your player in future.

Placement



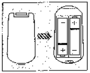
- Place the player on a firm, flat surface.
- Keep the player away from domestic heating equipment and direct sunlight.
- In a cabinet, allow about 2.5 cm (1 inch) of free space all around the player for adequate ventilation.
- If the SACD player cannot read SACDs/CDs/DVDs/VCDs correctly, use a commonly available cleaning CD/DVD to clean the lens before taking the SACD player to be repaired. Other cleaning methods may destroy the lens. Always keep the tray closed to avoid dust on the lens.
- When it is moved from a cold to a warm environment, allow the SACD player to acclimatize for at least 2 hours in order to avoid damage. When suddenly placed in a warm environment, the lens may cloud over. Playing an SACD/CD/DVD will not be possible then. Wait until moisture evaporates.

Infrared remote control

Loading the batteries

1 Open the battery compartment cover.
2 Insert two 'AA' (LR-6) batteries as indicated inside the battery compartment.
3 Close the cover.

Caution: Do not mix old and new batteries. Also never mix different types of batteries (standard, alkaline, etc.).



Functional Overview

Front and Rear Panels

POWER ON/OFF
– switches the player on/off

Disc Loading Tray

DISPLAY
– display the current status of the player

❚❚ PAUSE
– interrupts audio/video playback or moves to the next frame

■ STOP
– stops audio/video playback

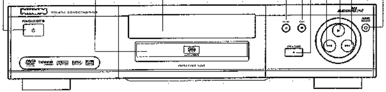
AUDIO DIRECT
– shut down video circuity to have better audio quality

▶▶❙ NEXT
– selects next track/title/chapter/index

▶ PLAY
– starts audio/video playback

❙◀◀ PREV
– selects previous track/title/chapter/index or return to beginning of current track/title/chapter/index

▲ EJECT
– opens/closes the disc tray



MAINS (AC Power)
– connect to power source

COAXIAL (Digital audio out)
– connect to digital (coaxial) audio equipment

OPTICAL (Digital audio out)
– connect to digital (optical) audio equipment

MULTICHANNEL AUDIO OUT
(For connection to a multichannel receiver)
– center speaker, subwoofer, front and surround speakers connection

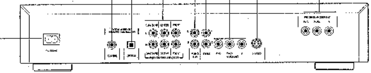
AUDIO OUT (Left/Right)
– connect to an amplifier, receiver or stereo system

Pr/Cr Pb/Cb Y PROGRESSIVE SCAN OUT
– connect to a TV with Pr/Cr Pb/Cb Y Progressive Scan inputs

S-VIDEO OUT
– connect to a TV with S-Video inputs

Pr/Cr Pb/Cb Y VIDEO OUT
– connect to a TV with Pr/Cr Pb/Cb Y inputs

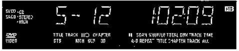
CVBS VIDEO OUT
– connect to a TV with CVBS video inputs



Caution: Do not touch the inner pins of the jacks on the rear panel. Electrostatic discharge may cause permanent damage to the unit.

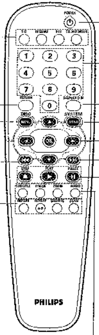
Display

SVCD	Super Video CD inserted
SACD	Super Audio CD inserted
CD	Audio CD inserted
VCD	Video CD inserted
•CD •STEREO •MCH	indicated the current active sound mode
DVD VIDEO	DVD video disc inserted
5 TITLE	- number of titles on DVD in Stop mode - number of current title
- 12 CHAPTER	Number of current chapter
5 TRACK	- number of tracks on SACD/CD/VCD in Stop mode - number of current track
12:09 TRACK TIME	track time in hours, minutes and seconds
1 12:09 TOTAL TIME	disc/program time in hours, minutes and seconds
REM TIME	remaining track time in hours, minutes and seconds when Display mode is set to Remaining time


SVCD •CD
SACD •STEREO
•MCH
DVD VIDEO
5 - 12
1:02:09
FTS
TITLE TRACK CHAPTER
DTS MCH SUR 3D
II SCAN SHUFFLE TOTAL REM TRACK TIME
A-B REPEAT TITLE CHAPTER TRACK ALL

II	playback temporarily interrupted (not active when setting Personal Preferences)
SCAN	first 10 seconds of each track/chapter are played
A-B REPEAT	A passage (a-b) isbeing repeated
SHUFFLE	tracks/chapters are played in random order
REPEAT TITLE CHAPTER TRACK	repeat Title/Chapter/Track/All active
FTS	FTS (Favourite track selection) program available for CD/DVD/VCD inserted
((O	remote control active (flashing)
DTS	DTS (Digital Theatre Sound) audio on the digital output
MCH	Sound mode button (for DVD) is set to Multi-channel
SUR	Sound mode button (for DVD/VCD) is set to Dolby Surround-compatible
3D	Sound mode button (for DVD/VCD) is set to 3D Sound

Remote Control


POWER
T-C
RESUME
FTS
SOUND MODE
1
2
3
4
5
6
7
8
9
RETURN
0
DISPLAY DIM
DISC
SYSTEM
MENU
OK
STOP
PLAY
PAUSE
SUBTITLE
ANGLE
ZOOM
AUDIO
REPEAT
REPEAT
SHUFFLE
SCAN
PHILIPS

T-C
– select title/chapter

RESUME
– to continue playback from STOP/PAUSE mode

FTS
– activate/deactivate Favourite Track Selection

SOUND MODE
– selects required sound mode
- for SACD: CD, Stereo or Multi-channel (if available)
- for DVD/VCD: Stereo, Dolby Surround-compatible, 3D sound or Multi-channel

RETURN
– go back to previous menu

DISC MENU
– access menu of a DVD disc

I◀◀
– search backward* / go to a previous chapter or track

REPEAT
– repeat chapter, track, title, disc

REPEAT (A-B)
– repeat a specific segment

SHUFFLE
– play tracks in random order

SCAN
– play the first 10 seconds of each track/chapter within a disc

POWER ⏻
– switches DVD Video player ON or to standby mode

0-9 numerical key pad
– select numbered items in a menu

DISPLAY DIM
– to select 3 different brightnesses for the display

SYSTEM MENU
– access or remove the player's menu

◀ ▶ ▲ ▼
– (left/right/up/down) select an item in the menu

OK
– acknowledge menu selection

▶▶I
– search forward* / go to the next chapter or track

STOP (■)
– stops playback

PLAY (▶)
– starts playback

PAUSE (II)
– pause playback temporarily / frame-by-frame playback

SUBTITLE
– select a subtitle language

ANGLE
– select a DVD camera angle

ZOOM
– enlarge video image

AUDIO
– select an audio language

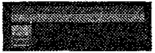
** Press and hold key for about two seconds*

On screen display information

Menu bar/Status window

Personal Preferences
Title/Track
Chapter/Index
Subtitle language
Angle
Zoom
Video FTS

Sound
Picture by Picture
Slow motion
Fast motion
Time search
Audio language
Sound Mode



Status window icons

The status window displays the current status of the player and is displayed together with the first part of the menu bar if activated in the Features menu (see Personal Preferences).

General

Disc type

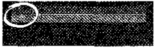
Tray status

Default screen

The default screen is displayed when the player is in STOP mode.
It may contain in a status window (see 'Status Window') and a 'Temporary Feedback Field,' which gives information concerning prohibited actions, playback modes, available angles, etc.

Temporary Feedback Field icons

Scan
Repeat All
Repeat Title
Repeat Track
Repeat Chapter
Shuffle
Shuffle Repeat
Repeat A to end
Repeat A-B
Current camera angle/number of available camera angles
Child Lock On
Child Safe
Resume
Action prohibited



Preparation

General Notes

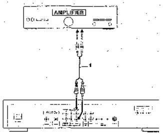
- Depending on your TV and other equipment you wish to connect, there are various ways you could connect the player. Use only one of the connections described below.
- For some connections, settings for digital and/or analogue output are required. These settings have to be made in the 'Personal Preferences' menu which is only accessible via your TV screen. In these cases you will need to connect the player to the TV as well.
- Please refer to the manuals of your TV, VCR, Stereo System or other devices as necessary to make the best connections.

Caution:
– Do not connect the player's audio out jack to the phono in jack of your audio system.

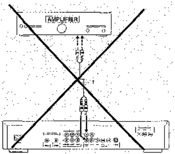
Connecting to audio equipment - analog

Connecting to an amplifier/receiver equipped with two channel analogue stereo

- Connect the audio Left and Right outputs for Front speaker connection (1) to the corresponding sockets on your amplifier, receiver or stereo system using the audio cable supplied.



Important:
– For the best sound quality with playback of audio CDs and stereo SACDs, always use the left and right connector of the high-quality stereo/ Multi-channel audio output. The separate stereo output is intended only for connection to video equipment such as a TV set.

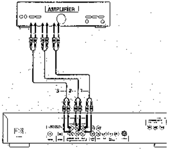


Connecting to a Multi-channel Audio/ (Video) receiver with 6 connectors

The SACD player contains a multi-channel decoder. This enables playback of SACDs recorded in Multi-channel. You only need to select Multi-channel using the Sound Mode key.

1 Connect the audio Left and Right outputs for Front speaker connection *(1)* to the corresponding input sockets on your receiver using the audio cable supplied.
2 Connect the audio Left and Right outputs for Surround speaker connection *(3)* to the corresponding inputs on your receiver using an optional audio cable.
3 Connect the audio outputs for Center speaker and Subwoofer connection *(2)* to the corresponding inputs on your receiver using an optional audio cable.

Note:
– *If the subwoofer is equipped with its own amplifier, the Subwoofer connection should be connected directly to the subwoofer.*



Connecting to an amplifier/receiver equipped with Dolby Pro Logic

1 Connect the audio Left and Right outputs for Front speaker connection *(1)* to the corresponding inputs on the Dolby Pro Logic Audio/Video amplifier/receiver using the audio cable supplied.
2 Set Analogue Output to Dolby Surround-compatible in the 'Personal Preferences' menu.

If you connect the player to a TV equipped with a Dolby Pro Logic decoder

- Connect the player to the TV as described in the section 'Connecting to a TV - Audio connections as above".

Connecting to audio equipment - digital

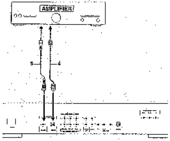
The digital output of the SACD player does not provide PCM (Pulse Code Modulation) signals. If your amplifier/receiver can only decode PCM and not multi-channel signals such as Dolby Digital, do not connect your SACD player using the digital input. This could damage your amplifier and/or speakers.

Connecting to an Audio/(Video) receiver with multi-channel decoder (Dolby Digital, MPEG 2 and DTS)

Digital Multi-channel sound (not for SACD)

For this you need a multi-channel A/V receiver that supports one or more of the DVD audio formats supported by your SACD player (MPEG 2, Dolby Digital and DTS). Check the receiver manual and the logos on front of the receiver.

1 Connect the player's digital audio output (optical *4* or coaxial *5*) to the corresponding input on the receiver. Use an optional digital (optical *4* or coaxial *5*) audio cable.



Notes:
– *If the audio format of the digital output does not match the capabilities of your receiver, the receiver will produce a strong, distorted sound. The audio format of the DVD disc in play is displayed in the Status Window when changing the audio format.*
– *6 Channel Digital Surround Sound via digital connection can only be obtained if your receiver is equipped with a Digital Multi-channel decoder. If your receiver does not contain a decoder, you can make the analogue connections as described in the section 'Connecting to a Multi-channel Audio/(Video) receiver with 6 connectors' to obtain 6 Channel Digital Surround Sound.*
– *SACD Multi-channel sound cannot be obtained via digital connection.*

Connecting to a TV

Notes:
– *Depending on your TV there are various ways to connect the player. These are shown in the illustration below.*
– *Please refer to your TV/VCR and any other User Manual(s) as necessary to make the optimal connections.*
· *Do not connect your SACD-player via your VCR because the video quality could be distorted by the copy protection system.*

Component Video (Pr/Cr Pb/Cb Y) connection

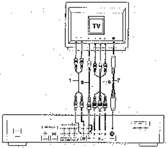
1 Connect the Pr/Cr Pb/Cb Y outputs on the DVD-player to the corresponding inputs on the TV using optional Pr/Cr Pb/Cb Y cable *(6)*.
2 Connect the Left and Right audio outputs to the audio left/right inputs on the TV *(1)*.

S-Video (Y/C) connection

1 Connect the S VIDEO OUT (Y/C) socket *(7)* to the corresponding socket on the TV using an optional S-Video cable.
2 If you wish to receive the sound via your TV, connect the STEREO OUT Left and Right output sockets *(1)* to the corresponding sockets on the TV using the audio cable supplied.

Video CVBS connection

1 Connect the VIDEO OUT (CVBS) socket *(8)* to the corresponding socket on the TV using the video cable supplied.
2 If you wish to receive the sound via your TV, connect the STEREO OUT Left and Right output sockets *(1)* to the corresponding sockets on the TV using the audio cable supplied.

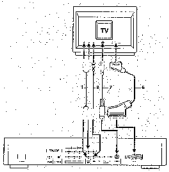


SCART connection

1 Connect the SCART to the corresponding connector on the TV using the SCART cable supplied *(6)*.
2 If your TV is not equipped with a SCART you can select one of the following alternative connections:

Video CVBS connection

1 Connect the VIDEO OUT (CVBS) socket *(8)* to the corresponding socket on the TV using the video cable supplied.
2 If you wish to receive the sound via your TV, connect the STEREO OUT Left and Right output sockets *(1)* to the corresponding sockets on the TV using the audio cable supplied.



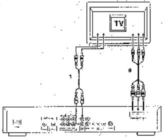
Progressive Scan (Pr/Cr Pb/CbY)

- Progressive Scan provides a flicker free Image with the highest effect on film based sources.
- DVD discs consist of film and video based content. Progressive Scan conversion is capable of 3:2 pulldown for film based content.
- It can double the vertical resolution of the picture to 525 lines every time the picture is refreshed (1/60th of a second).
- It greatly improves the quality of moving images, especially during Slow Motion mode.
- To enjoy the full quality potential offered by this Philips Progressive Scan DVD/SACD player, a Progressive TV is required.
- DCDi by Faroudja computes and tracks the angles of edges and uses this information to optimally fill in the mixing pixels.

1 Connect the Pr/Cr Pb/CbY PROGRESSIVE SCAN OUTPUTS on the SACD player to the PROGRESSIVE SCAN INPUTS on the TV using an optional Pr/Cr Pb/CbY cable (9).

2 Connect the Left and Right AUDIO OUTPUTS of the SACD player to the audio left/right inputs on the TV (1).

Note:
– When a PAL DVD is played, there may not be any output from the Progressive Scan due to copy protection.



6 Channel settings

Front speaker

L (Large): When the front speakers can reproduce low frequency signals below 120Hz
S (Small): When the front speakers cannot produce low frequency signals below 120Hz

Center Speaker

L (Large): When the center speaker can reproduce low frequency signals below 120Hz
S (Small): When the center speaker cannot produce low frequency signals below 120Hz
Off: When the center speaker is not connected

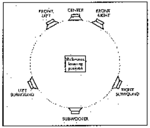
Surround speakers

L (Large): When the surround speakers can reproduce low frequency signals below 120Hz
S (Small): When the surround speakers cannot produce low frequency signals below 120Hz
Off: When the surround speakers are not connected

Subwoofer

On: When you connect a subwoofer
Off: When a subwoofer is not connected

* *Notes:*
– You can use your TV as center speaker. Please refer to your TV User Manual to check if your TV can reproduce low frequency signals below 120Hz. If not, set Center Speaker to S(small).
– When Center Speaker is selected in the Personal Preferences 'menu, the sound from both center speaker and audio L/R will contain the center speaker audio.

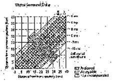


Delay times

The SACD player is set to reproduce correctly synchronized Digital Surround Sound in a listening area where the surround speakers are about 150cm nearer to the listening position than the front speakers, and the center speaker is in line with the front speakers. To adjust for other listening area arrangements, adapt delay times according to the following:

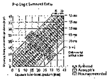
Digital Surround

Measure the distances in centimeters from the front speaker plane and from the surround speaker plane to the listening positioning plane.
Subtract the surround distance from the front distance and divide by 30. The result is the required Surround Channel delay time in milliseconds.
If the center speaker is on the front speaker plane, no center speaker delay is needed. If, however, it is nearer to the listening position, measure the distance in centimeters between the front and center speaker planes, and divide by 30. The result is the required Center Channel delay time in milliseconds.



Dolby Pro Logic

If the delay times for Surround Channel and Center Channel are set for Digital Surround mode, the delay times for Dolby Pro Logic mode will automatically be calculated and set.

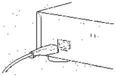


Connecting the power supply

1 Check if the power voltage as shown on the type plate (on the back of the player) corresponds to your local power voltage.
2 Plug the female end of the power cable supplied into the Power connector POWER SUPPLY on the rear of the player.
3 Plug the male end of the cord into an AC outlet.

Note:
– When the player is in the STANDBY or OFF position, it will still consume some power.
– If you wish to disconnect your player completely from the power supply, pull the plug from the AC Outlet.

Caution:
Only qualified service personnel should remove the cover or attempt to service this device.



Operation

General Explanation

About this manual

This manual gives the basic instructions for operating the SACD player.
Some DVDs require specific operation or allow only limited operation during playback. When this occurs, the symbol ╳ appears on the TV screen, indicating that the operation is not permitted by the player or the disc.

Remote control operation

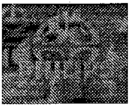
- Unless stated, all operations can be performed by the remote control. Always point the remote control directly at the player, making sure there are no obstructions between the remote and the player.
- Corresponding keys on the front panel of the player can also be used.

Menu bar operation

- A number of operations can also be performed using the menu bar on the screen. The menu bar can be activated by pressing any of the following keys on the remote control: SYSTEM MENU, T-C, Angle, Audio Language, Subtitle Language, Zoom and FTS.
- The following functions can be operated via the menu bar.
  - Personal Preferences
  - Track/title selection
  - Chapter selection
  - Audio language selection
  - Subtitle language selection
  - Angle selection
  - Zoom
  - Video FTS selection
  - Sound mode
  - Picture-by-picture
  - Slow motion
  - Fast motion
  - Time search
- The various items can be selected using the ◀ ▶ (left/right cursor) keys or by pressing the relevant keys on the remote control.
- By pressing SYSTEM MENU, the menu bar can be removed from the screen.
- When selecting an item in the menu bar, the selected item will be highlighted and the cursor keys (on the remote control) for operating the function are displayed below the icon.
- < or > indicates that more items are available at the left/right hand side of the menu bar. Press ◀ ▶ (left/right cursor) to select these items.

Switching on

1 If necessary, switch on the TV and select the video input for your SACD player.
2 Press ON/OFF on the player front panel or STANDBY on the remote control.
→ The player display will light up.
→ If the player is connected to the TV, the start-up screen appears.



Personal Preferences

In this mode you can set your personal preferences for a number of player features. Some settings must always be selected. This depends on the type of audio equipment connected. For this see the section 'Connecting to audio equipment.'

General operation:

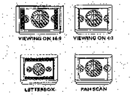
1 Press SYSTEM MENU on the remote control.
2 Select in the menu bar and press ▼ (down cursor).
→ The Personal Preferences menu appears.

- Use the ◀ ▶ ▲ ▼ (left/right/up/down) keys to toggle through the menus, submenus and submenu options.
→ When a menu item is selected, the cursor keys (on the remote control) to operate the item are displayed next to the item.
- Press OK to confirm and return to the main menu.
The following items can be adapted:

Picture

- TV Shape

If you have a wide screen (16:9) TV, select 16:9.
If you have a regular (4:3) TV, select 4:3.
If you have a 4:3 TV, you can also select between:
Letterbox for a 'wide-screen' picture with black bars top and bottom, or Pan Scan, for a full-height picture with the sides trimmed. If a disc supports the format, the picture will be shown accordingly.



- Black level shift (NTSC only)

Select ON for adapting the colour dynamics to obtain richer contrasts.

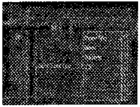
- Video shift

Use this setting to personalize the position of the picture on your TV by shifting it to the left or right. Use ◀ ▶ (left/right) keys to shift and OK to exit.

- DCC (on Pr/Cr Pb/Cb Y Progressive Scan Out only)

Digital Crystal Clear (DCC) allow you to fine-tune the following parameters on the progressive scan component output.

- Gamma - allows you to adjust the intensity of the picture non-linearly. A positive value will allows you to bring out low level detail on dark scene while a negative value will emphasis on contrast.
- Sharpness - allows you to adjust sharpness of the picture.
- Chroma Delay - is where the Chroma (color) and luma (brightness) signal is out of synchronize. This allows you to adjust the advance delay of the chroma signal to yield a perfectly clear picture.
- DCDi (New Directional Correlation Deinterlacing) - it computes and tracks the angle of edge to fill in the missing pixel on TV screen. Switching DCDi ON will optimize the image quality significantly especially during the slow motion playback.



♪ Sound

- Digital and Analog output Settings for DVD/VCD

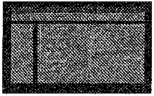
Connected audio system	Digital out	Analog out
Amplifier or TV with two channel analog stereo	Off	Stereo or 3D Sound
Amplifier or TV with Dolby Surround	Off	Dolby Surround - compatible
Amplifier with two channel digital stereo	PCM only	Stereo or 3D Sound
A/V receiver with multi-channel decoder (Dolby Digital, MPEG, DTS)	All	Stereo, 3D Sound, Dolby Surround -compatible or Multi-channel
Multi-channel A/V receiver with 6-ch connectors	Off	Multi-channel

- Digital output

Factory setting is ALL. If you connect equipment with a digital input change the setting to ALL or PCM (Pulse Code Modulation - see below) only. Both coaxial and optical outputs are then switched on (not for SACD). If your equipment doesn't include a digital multichannel decoder, set the digital output to PCM. Both coaxial and optical outputs are then switched on. See 'Digital and Analog output Settings for DVD/VCD' above.

- PCM output

PCM (Pulse Code Modulation) is a method of encoding audio information in a digital format. PCM samples analog audio information at a fixed sampling rate and measures the amplitude (volume) of the audio signal with a precision determined by the sampling size. Audio is encoded on CDs in the PCM format with a sampling frequency of 44.1kHz and a 16-bit sampling size. A 16-bit sample size can contain 65,536 possible levels of sound volume which corresponds to a dynamic range of 96dB. A DVD can be encoded in PCM with a sampling frequency of up to 96kHz and a 24-bit sample size.



The PCM setting on your player allows you to select the PCM sample-rate frequency of the analog and digital outputs. You can set it to either 48kHz or 96kHz. Factory setting is 48kHz. Note when using digital outputs:

- If you have a digital amplifier with a PCM input of 96kHz, connected via digital output, choose this frequency in the menu. Do not choose 96kHz if your amplifier has a digital PCM input of 48kHz since then a strong distorted sound may be produced.
- Due to copy-protection the digital outputs may be muted when 96kHz is selected, while the analog outputs will remain active. Switching the PCM output back to 48kHz will reactivate the digital output.

- Analogue output

Select Digital and Analog output settings for DVD/VCD. Select Stereo, Dolby Surround-compatible, 3D Sound or Multi-channel. Factory setting is Multi-channel.
Multi-channel: Select this setting when using a multi-channel audio/(video) receiver with six inputs. In this mode, the player will perform Dolby Digital 5.1-channel decoding when applicable, and Dolby Pro Logic decoding on DVD-Video and Video-CD discs with 2-channel sound tracks. No Dolby Pro Logic decoding is done with (Super) Audio CD discs.
Dolby Surround-compatible: Select this setting when using an equipment with a Dolby Surround-compatible Pro Logic decoder. In this setting, the 5.1 audio channels (Dolby Digital, MPEG-2) are downmixed to a Dolby Surround-compatible 2-channel output.
3D-Sound: In a setup without rear speakers (analog stereo output), 3D Sound remixes the six channels of digital surround into a two-speaker output while retaining all of the original audio information. The result is the listening sensation of being surrounded by multiple speakers.

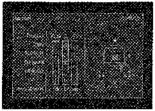
During DVD or Video-CD playback, these values can be selected directly with the 'SOUND MODE' key.

- Night Mode

Optimizes the dynamics of the sound for low-volume playback. This setting can only be used with discs that support the Night Mode feature.

- Speaker settings

Allows you to select speaker settings, volume balance and delay time, and to test the speaker settings.
Speaker settings are only active on the Multi-Channel Audio Out outputs for both DVD and SACD. Speaker settings will not be used during playback in the SACD Stereo mode.



Notes:
– Volume level setting is not applicable for SACD playback.
– To preserve highest sound quality for playback of multichannel SACD, bass filter for speakers will only be activated when ALL speakers are set to small in speaker setting.

- Karaoke vocal

Put this setting to ON only when a multi-channel karaoke DVD is being played. The karaoke channels on the disc will then be mixed into a normal stereo sound.

Language

Select the required Menu, Audio and Subtitle language.
Audio language - The sound will be in the language you select, provided it is available on the disc in play. If not, speech will revert to the first spoken language on the disc. You can choose from 16 different languages.
Subtitle language - The subtitles will be in the language you select, provided it is available on the disc in play. If not, subtitles will revert to the first subtitle language on the disc. You can choose from 16 different languages.
Menu language - The On-screen Menus will be displayed in the language you select. You can choose from 8 different languages.

Audio language and Subtitle language can also be adapted via the Menu bar on the screen.

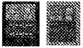
Features

- Access Control (DVD/VCD only)

Access Control contains the following features:
Disc Lock - When Disc Lock is set to ON, a 4-digit PIN code must be entered in order to play discs.
Parental control - Allows the conditional presentation of DVD discs containing Parental Control information.

- Status Window

Displays the current status of the player and appears with the menu bar. When disc playback is stopped, it is displayed with the 'Temporary Feedback Field' in the default screen. See 'On-Screen Display' information.
The factory setting is ON. Select OFF to suppress display of the Status Window.

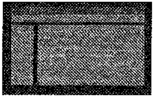


- Low Power Standby

If this setting is set to ON, the player will go in low-power standby when the Stand-by key (remote control) is pressed. While in low-power standby, scart AUX-I/O will no longer be available.

- Sound Mode (SACD only)

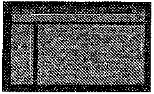
Selection of default SACD Sound Mode: Stereo or Multi-channel. Sound Mode setting can be changed during playback with the Sound Mode button on the remote control. When selecting Multi-channel make sure your sound mode is set up for Multi-channel reproduction.



Display information

- Display

Elapsed time - during playback the elapsed playing time will be displayed.
Remaining time - during playback the remaining playing time will be displayed.
Display setting can be changed during playback using the DISPLAY key on the remote control.



- Player Display Dim (via remote control)

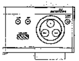
This feature allows you to set the front panel display brightness. By repeatedly pressing the DIM key on the remote control you can select from 3 different brightness levels.

- PBC (Playback Control)

This feature allows you to disable or enable the PBC (Playback Control) menu of VCD discs. See under 'Special VCD features': Factory setting is ON.

Operation - Audio (Super Audio CD and CD)

Loading an SACD or Audio disc

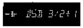


1 Press ▲ OPEN/CLOSE on the front of the player to open the disc tray.
2 Load your chosen disc in the tray, label side up. Make sure it is properly inserted in the correct recess.
3 Gently push the tray, or press ▲ OPEN/CLOSE, to close the tray.
→ READ will appear on the player display and in the status window (if TV is on).

If a Super Audio CD is inserted, the Sound Modes available on the disc will be shown on the player display. The current Sound Mode is indicated on both player display (with a bullet) and screen. (if TV is on).

Playing an SACD or Audio disc

- Press ► PLAY to start playback.
→ During playback of Super Audio CDs and audio discs, all functions can be operated via the keys on the remote control and the front player.
→ If the TV is on, the Super Audio CD or the Audio CD screen will appear.
→ During play, the current track number and its elapsed playing time will be shown on the player display (on the screen). If a default Display Time setting (Total Time/Remaining Time) is made in the Personal Preferences menu, the relevant time will be indicated during playback. With the DISPLAY key on the remote control other time indications can be selected.
→ When playing a Super Audio CD, the currently selected Sound Mode will be indicated on the display with a bullet.
→ At the beginning of each track, the number of front channels and surround channels will be displayed (e.g. 3/2). If a subwoofer channel is present this will also be displayed (+1).



→ If a default Sound Mode (Stereo/Multi-channel) is selected in the Personal Preferences menu and this Sound Mode is not available on the inserted disc, playback will start in the first available Sound Mode on the the disc.
→ Playback will stop at the end of the disc.
- To stop play at any other time, press ■ STOP.
→ The number of tracks and the total playing time will be shown on the player display (and on the screen).

Sound Mode - SACD playback

- Press SOUND MODE on the remote control to select the desired sound mode:
Stereo - Super Audio Stereo reproduction.
Multi-channel - Super Audio Multi-channel reproduction.
CD - normal CD stereo reproduction (press ■ STOP first, then press SOUND MODE).
The sound modes available on the disc will be indicated on the display. When selecting Multi-channel, make sure your speaker configuration is set up for Multi-channel reproduction.

Pause

- Press II PAUSE during playback.
- To return to playback, press ► PLAY.

Search

- To search backward or forward through the disc at four times the normal speed, hold down ◄◄ REVERSE or ►► FORWARD for about one second during playback.
→ Search begins, and sound is partially muted.
- To step up to eight times the normal speed, press ◄◄ REVERSE or ►► FORWARD again.
→ Search goes to eight times the speed, and the sound is muted.
- To return to four times the normal speed, press ◄◄ REVERSE or ►► FORWARD again.
- If the TV is on, search speed and direction are indicated on the screen each time ◄◄ REVERSE or ►► FORWARD is pressed.
- To end the search, press ► PLAY to resume playback or press ■ STOP to stop playback.

Moving to another track

- Press ►| NEXT or |◄ PREVIOUS briefly during playback to go to the next track or to return to the beginning of the current track.
- Press |◄ PREVIOUS briefly to step back to the previous track.
- To go directly to any track, enter the track number using the numerical keys (0 9).

Shuffle

- Press SHUFFLE during playback.
→ The playing order of the tracks is changed.
- To return to normal playback, press SHUFFLE again.

Repeat track/disc

- To repeat the current track, press REPEAT.
→ REPEAT TRACK appears on the display.
- To repeat the entire disc, press REPEAT a second time.
→ REPEAT appears on the display.
- To exit Repeat mode, press REPEAT a third time.

Repeat A-B

To repeat a specific portion of a track:
- Press REPEAT A-B at your chosen starting point.
→ A- appears on the player display.
- Press REPEAT A-B again at your chosen end point.
→ A-B appears on the display, and the sequence begins to play repeatedly.
- To cancel the sequence and continue playback, press REPEAT A-B.

Scan

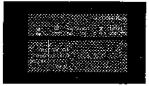
Scanning plays the first 10 seconds of each track on the disc.
- Press SCAN.
- To continue playback at your chosen track, press SCAN again or press ► PLAY.

FTS (Favourite Track Selection) - Audio CD only

- The FTS Programme allows you to store your favourite tracks for a particular disc in the player memory.
- Each FTS Programme can contain 20 tracks.
- Each time a FTS program is played it will be placed at top of the list. When the list is full and a new program is added, the last program on the list will be removed from the list.
- The selections can be called up and played at any time.
- FTS programming is not possible in Audio Direct mode.

Storing a FTS program

1 Load a disc and stop playback.



2 Use ▼ (down cursor) to go to the list of available tracks.
3 Use ◄ and ► (left/right cursor) to select tracks from the list. To go directly to any track, enter the track number using the numerical keys (0-9).
4 Store each track by pressing OK.
→ The track numbers will be added to the list.
→ The number of tracks and the playing time of the programme will be shown on the TV screen and the player display.

When your FTS program is complete, press ► PLAY to start playing; the FTS program will be automatically memorized.

- Press FTS or use the ◄ ► (left/right cursor) to set FTS to ON or OFF.

Erasing a track from a FTS-program

1 Use ▼ (down cursor) to go to the list of selected tracks.
2 Use ◄ and ► (left/right cursor) to select the track number you wish to erase. To go directly to any track, enter the track number using the numeric keys 0-9.
3 Press OK.
→ The track number will be erased from the list of selected tracks.

Erasing the complete program

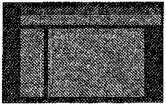
- Use ▼ (down cursor) to select CLEAR ALL and press OK.
→ The complete FTS Programme for the disc will be erased.

Operation - Video (DVD and VCD)

Access control; disc lock (DVD and VCD)

Activating/deactivating the disc lock

1 In the STOP mode, select ACCESS CONTROL in the features menu using the ▼/▲ (down/up) keys and press ▶ (right cursor).
2 Enter a 4-digit code of your own choice.
3 Enter the code a second time.
4 Move to CHILD LOCK using the ▼/▲ (down/up) keys.



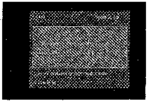
5 Move to 🔒🔓 using the ▶ (right cursor) key.
6 Select 🔒 using the ▼/▲ (down/up) keys.
7 Press OK to confirm or ◀ (left cursor) to confirm and press ◀ (left cursor) again to exit the menu.
→ Now unauthorized discs will not be played unless the 4-digit code is entered.
8 Select 🔓 to deactivate the Disc Lock.

Note: Confirmation of the 4-digit code is necessary when:
- *The code is entered for the very first time (see above),*
- *The code is changed (see 'Changing the 4-digit code'),*
- *The code is cancelled (see 'Changing the 4-digit code');*
- *Both Disc Lock and Parental Control are switched Off and the code is requested.*

Authorizing discs

- Insert the disc. See 'Loading discs'.
  → The 'child protect' dialog will appear.
  You will be asked to enter your secret code for 'Play Once' or 'Play Always.' If you select 'Play Once', the disc can be played as long as it is in the player and the player is ON. If you select 'Play Always', the disc will become child safe (authorized) and can always be played, even if the Child Lock is set to ON.

Notes:
- *The player memory maintains a list of 120 authorized ('Child safe') disc titles. A disc will be placed in the list when 'Play Always' is selected in the 'child protect' dialog.*
- *Each time a 'child safe' disc is played, it will be placed on top of the list. When the list is full and a new disc is added, the last disc in the list will be removed from the list.*
- *Double-sided DVDs may have a different ID for each side. In order to make the disc 'child safe', each side has to be authorized.*
- *Multi-volume VCDs may have a different ID for each volume. In order to make the complete set 'child safe', each volume has to be authorized.*



Deauthorizing discs

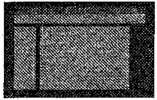
- Insert the disc. See 'Loading discs'.
  → Playback starts automatically.
- Press ■ STOP while ☺ is visible.
  → The ☹ will appear and the disc is now deauthorized.

Access control; Parental control (DVD-Video only)

Movies on DVDs may contain scenes not suitable for children. Therefore, discs may contain 'Parental Control' information which applies to the complete disc or to certain scenes on the disc. These scenes are rated from 1 to 8, and alternative, more suitable scenes are available on the disc. Ratings are country dependent. The 'Parental Control' feature allows you to prevent discs from being played by your children or to have certain discs played with alternative scenes.

Activating/Deactivating Parental Control

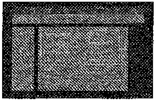
1 In STOP mode, select ACCESS CONTROL in the features menu using the ▼/▲ (down/up) keys and press ▶ (right cursor).



2 Enter your 4-digit code. If necessary, enter the code a second time.
3 Move to PARENTAL LEVEL using the ▼/▲ (down/up) keys.
4 Move to Value Adjustment (1-8) using the ▶ (right cursor) key.
5 Then use the ▼/▲ (down/up) keys or the numerical keys on the remote control to select a rating from 1 to 8 for the disc inserted.

Rating 0 (displayed as '– –'):
Parental Control is not activated. The Disc will be played in full.

Ratings 1 (child safe) to 8 (adults only):
The disc contains scenes not suitable for children. If you set a rating for the player, all scenes with the same rating or lower will be played. Higher rated scenes will not be played unless an alternative is available on the disc. The alternative must have the same rating or a lower one. If no suitable alternative is found, playback will stop and the 4-digit code has to be entered.



6 Press OK or ◀ (left cursor) to confirm and press ◀ (left cursor) again to exit from the menu.

Country

1 In STOP mode, select ACCESS CONTROL in the features menu using the ▼/▲ (down/up) keys and press ▶ (right cursor).
2 Enter the 4-digit code.
3 Move to CHANGE COUNTRY using the ▼ (down) key.
4 Press the ▶ (right) key.
5 Select a country using ▼/▲ (down/up cursor).
6 Press OK or ◀ (left cursor) to confirm and press ◀ (left cursor) again to exit from the menu.

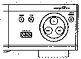
Changing the 4-digit code

1 In STOP mode, select ACCESS CONTROL in the features menu using the ▼/▲ (down/up) keys and press ▶ (right cursor).
2 Enter the old code.
3 Move to CHANGE CODE using the ▼ (down) key.
4 Press the ▶ (right) key.
5 Enter the new 4-digit code.
6 Enter the code a second time and reconfirm by pressing OK.
7 Press ◀ (left cursor) to exit the menu.

If you forget your 4 digit code

1 Press ■ STOP to exit the 'Child Protect' screen.
2 Select ACCESS CONTROL in the features menu using the ▼/▲ (down/up) keys.
3 The 4-digit code can be cancelled by pressing ■ STOP four times in the 'Access Control' dialog.
4 You can then enter a new code (twice!) as described above (Changing the 4 digit code).

Loading DVDs or VCDs



1 Press ▲ OPEN/CLOSE on the front of the player to open the disc tray.
2 Load your chosen disc in the tray, label side up. Make sure it is properly inserted in the correct recess.
3 Gently push the tray, or press ▲ OPEN/CLOSE, to close the tray.
→ READ will appear in the status window and on the player display and playback will start automatically.

Note:
– *If 'Disc Lock' is set to ON and the disc inserted is not authorized, the 4-digit code must be entered and/or the disc must be authorized (see 'Access Control').*

Playing a DVD-video disc

Playing a title

→ After inserting the disc and closing the tray, playback starts automatically. The status window of the player display shows the type of disc loaded, as well as the disc's information and playing time.
→ The disc may invite you to select an item from a menu. If the selections are numbered, press the appropriate numerical key 0-9; if not, use the ▼/▲, ◀/▶ (down/up/left/right) keys to highlight your selection, then press OK.
→ The currently-playing title and chapter number will be displayed in the menu bar and the player display. The elapsed playing time will be indicated in the status window and on the player display.
→ At the beginning of each title, the number of front channels and surround channels will be displayed (e.g. 3/2). If a subwoofer channel is present this will also be displayed (+1).
→ If the audio format (MPEG, Dolby Digital, etc.) of a title changes during play, this will be indicated on the display.

- If required, you can use the SOUND MODE key to select Stereo, Dolby Surround-compatible, 3D-Sound or Multi-channel reproduction. Play may stop at the end of the Title; this can result in returning to menu.
- To stop playback, press ■ STOP.
  → The default screen will appear, giving information about the current status.
- You can resume playback from the point at which you stopped playback. Press ▶ PLAY; when you see the ▶ RESUME on the screen, press ▶ PLAY again.
  → The RESUME feature applies not only to the disc in the player, but also to the last four discs you have played. Simply reload the disc and press RESUME on the remote control. Or, press ▶ PLAY when you see the ▶ RESUME on the screen, then press ▶ PLAY again.

Notes:
– *Since it is usual for DVD movies to be released at different times in different regions of the world, all players have region codes and discs may have an optional region code.*
– *If you load a disc with a different region code than your player, you will see the region code notice on the screen.*
– *The disc will not play, and should be unloaded.*

Playing a video CD

Playing a disc

→ After inserting the disc and closing the tray, playback starts automatically. The status window of the player display shows the type of disc loaded, as well as the disc's information and playing time.
→ The disc may invite you to select an item from the menu. If the selections are numbered, press the appropriate numeric key 0-9.
→ The track number currently playing will be displayed in the menu bar and the player display. The elapsed playing time will be indicated in the status window and the player display.

- If required, you can use the SOUND MODE key to select Stereo, Dolby Surround-compatible or 3D-Sound reproduction.
- To stop playback, press ■ STOP.
  → The default screen will appear.
- You can resume playback from the point at which you stopped playback. Press ▶ PLAY; when you see the ▶ RESUME on the screen, press ▶ PLAY again.
  → The RESUME feature applies not only to the disc in the player, but also to the last four discs you have played. Simply reload the disc and press RESUME on the remote control. Or, press ▶ PLAY when you see the ▶ RESUME on the screen, then press ▶ PLAY again.

General features

Note:
– *Unless stated, all operations described are based on remote control use. Some operations can be carried out using the menu bar on the screen.*

Moving to another title/track

When a disc has more than one title or track (which you can see from both menu bar and the player display), you can move to another title as follows:

- Press T-C (title), then press ▶▶| NEXT briefly during play to select the next title/track.
- Press T-C (title), then press |◀◀ PREVIOUS briefly during play to return to the beginning of the current title/track. Press |◀◀ PREVIOUS briefly again to move back to the previous title/track.
- To go directly to any title or track, press enter the track T-C (title), then enter the title number using the numeric keys 0-9.

Notes:
– *If the number has more than one digit, press the keys in rapid succession.*

Moving to another chapter/index

When a title on a disc has more than one chapter or a track has more than one index (which you can see from the player display and on the menu bar), you can move to another chapter/index as follows:

- Press ▶▶| NEXT briefly during play to select the next chapter/index.
- Press |◀◀ PREVIOUS briefly during play to return to the beginning of the current chapter/index. Press |◀◀ PREVIOUS briefly again to move back to the previous chapter/index.
- To go directly to any chapter or index, press T-C (chapter), then enter the chapter or index number using the numeric keys 0-9.

Notes:
– *If the number has more than one digit, press the keys in rapid succession.*

Slow Motion

- Select ▷ (SLOW MOTION) in the menu bar.
- Use the ▼ (down) keys to enter the SLOW MOTION menu.
  → Playback will pause.
- Use the ◀ ▶ (left/right) keys to select the required speed: -1, -1/2, -1/4 or -1/8 (backward), or +1/8, +1/4, +1/2 or +1 (forward).
- Select 1 to play the disc at normal speed again.
- If ▮▮ is pressed, the speed will be set to zero (PAUSE).
- To exit slow motion mode, press ▶ PLAY and ▲ (up cursor).
  You can also select Slow motion speeds by using the ▷ key on the remote control.

Still Picture and Step Frame

- Select ◀▮▮▶ (STEP BY STEP) in the menu bar.
- Use the ▼ (down) key to enter the step by step menu.
  → Playback will pause.
- Use the ◀ ▶ (left/right) to select the previous or next picture frame.
- To exit step by step playback, press ▶ (PLAY).
  You can also step forward by pressing ▮▮ PAUSE repeatedly on the remote control.

Search

- Select ▷▷ (FAST MOTION) in the menu bar.
- Use the ▼ (down) keys to enter the FAST MOTION menu.
- Use the ◀ ▶ (left/right) keys to select the required speed: -32, -8 or -4 (backward), or +4, +8, +32 (forward).
- Select 1 to play the disc at normal speed again.
- To exit FAST MOTION mode, press ▶ PLAY and then ▲ (up cursor).
  To search forward or backward through different speeds, you can also hold down ◀◀ or ▶▶.

Repeat

DVD-Video Discs - Repeat chapter/title/disc

- To repeat the current chapter, press REPEAT.
  → REPEAT CHAPTER appears on the player display.
- To repeat the current title, press REPEAT a second time.
  → REPEAT TITLE appears on the display.
- To repeat the entire disc, press REPEAT a third time.
  → REPEAT ALL appears on the display.
- To exit Repeat mode, press REPEAT a fourth time.

Video CDs
Repeat track/disc

- To repeat the current track, press REPEAT.
  → REPEAT TRACK appears on the player display.
- To repeat the entire disc, press REPEAT a second time.
  → REPEAT appears on the display and the TV screen.
- To exit Repeat mode, press REPEAT a third time.

Repeat A-B

To repeat a specific portion of a title:

- Press REPEAT A-B at your chosen starting point.
  ➜ A appears briefly on the screen.
- Press REPEAT A-B again at your chosen end point.
  ➜ REPEAT A-B appears briefly on the display, and the repeat sequence begins.
- To cancel the sequence and continue playback, press REPEAT A-B.

Scan

Scanning plays the first 10 seconds of each chapter/track on the disc.

- Press SCAN.
- To continue playback at your chosen chapter/track, press SCAN again or press ▶ PLAY.

Shuffle

DVD-Video discs

This shuffles the playing order of chapters within a title, if the title has more than one chapter.

- Press SHUFFLE during playback.
  ➜ The shuffle icon will appear on the screen for about 2 seconds.
- To return to normal playback, press SHUFFLE again.

Video CDs

This feature shuffles the playing order of tracks, if the disc has more than one track.

- Press SHUFFLE during playback.
  ➜ The shuffle icon will appear on the screen for about 2 seconds.
- To return to normal playback, press SHUFFLE again.

Time search

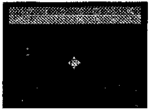
The Time Search function allows you to start playing at any chosen time on the disc.

- Select 🔍 (TIME SEARCH) in the menu bar.
- Press ▼ (down cursor).
  ➜ Playback will pause.
  ➜ A time edit box appears on the screen, showing the elapsed playing time of the current disc.
- Use the numeric keys to enter the required start time. Enter hours, minutes and seconds from left to right in the box.
  ➜ Each time an item has been entered, the next item will be highlighted.
- Press OK to confirm the start time.
  ➜ The time edit box will disappear and playback starts from the selected time on the disc.

Zoom

The Zoom function allows you to enlarge the video image and to pan through the enlarged image.

- Select 🔍 (ZOOM) in the menu bar.
- Press ▼/▲ (down/up) keys to activate the ZOOM function and select the required zoom factor: 1.33 or 2 or 4.
  ➜ Playback will pause.
  ➜ The selected zoom factor appears below the Zoom icon in the menu bar, and '*Press OK to pan*' appears below the menu bar.
  ➜ The picture will change accordingly.
- Press OK to confirm the selection.
  ➜ The panning icons appear on the screen.
- Use the ◀ ▶ ▼ ▲ (left/right/down/up) keys to pan across the screen.
- When OK is pressed only the zoomed picture will be shown on the screen.
- If you wish to zoom at any moment, press 🔍 ZOOM and select the required zoom factor as described above.
- To exit ZOOM mode:
  - Press ▶ PLAY to resume playback.



FTS-Video

- The FTS-Video function allows you to store your favourite titles and chapters (DVD) and favourite tracks and indexes (VCD) for a particular disc in the player memory.
- FTS programme can contain 20 items (titles, chapters etc.).
- A programmed FTS will be placed on top of the list when playback is activated. When the list is full, a new programme will replace the last programme on the list.
- The programme can be selected and played at any time.

Storing a FTS-Video Programme

- While playback is stopped, select VIDEO FTS ☑ in the menu bar.
- Press ▼ (down cursor) to open the menu.
  ➜ The VIDEO FTS menu appears.

Storing titles/tracks

- Press ▼ (down cursor) key to select TITLE.
- Use ◀ ▶ (left/right) keys to select the required title.
- Press OK if you wish to store the entire title.
  ➜ The title number will be added to the list of selections.

Storing chapters

- Press ▼ (down cursor) key on the selected title number.
  ➜ The title number will be marked and the highlight moves to the first available chapter number for this title.
- Use ◀ ▶ (left/right) keys to select the required chapter number.
- Press OK to confirm the selection.
  ➜ The title/chapter selection will be added to the list of selections.
- Press OK or SYSTEM MENU to exit the VIDEO FTS ☑ menu.

Erasing an FTS-Video Programme

- While playback is stopped, select VIDEO FTS ☑ in the menu bar.
- Use ▼ (down cursor) key to select PROGRAM.
- Use ◀ ▶ (left/right) keys to select the required number.
- Press OK to erase the selection.
- Press ▲ (up) key or SYSTEM MENU to exit the VIDEO FTS ☑ menu.

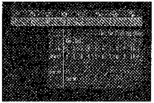
Erasing all selections

- While playback is stopped, select VIDEO FTS ☑ in the menu bar.
- Use ▼ (down cursor) key to select CLEAR ALL.
- Press OK.
  ➜ All selections will be erased.
- Press ▲ (up) key or SYSTEM MENU to exit the VIDEO FTS ☑ menu.

Switch FTS Video ON or OFF

- Select VIDEO FTS ☑ in the menu bar and press ▼ (down cursor) key.
  ➜ The video FTS menu appears.
- Press ◀ ▶ (left/right) keys to select ON or OFF.
- Press ▲ (up) key or SYSTEM MENU to exit the VIDEO FTS ☑ menu.

You can also switch FTS Video ON or OFF by using the FTS button on the remote control.



Special DVD-features

Checking the contents of DVD Video discs: Menus

DVDs may contain menus to navigate the disc and access special features. To use the menu, press the appropriate numerical key or use the ▼, ▲, ▶, ◀ (down/up/left/right) keys to highlight your selection, then press OK.

Title menus

- Press DISC MENU.
  ➜ If the current title has a menu, the menu will appear on the screen. Otherwise, the disc menu will be displayed.
- The menu can list camera angles, spoken language and subtitle options, and chapters for the title.
- To remove the title menu, press DISC MENU again.

Menu Disc

- Press T-C followed by DISC MENU.
  ➜ The disc menu is displayed.
- To remove the disc menu, press DISC MENU again.

Camera Angle

If the disc contains sequences recorded from different camera angles, the angle icon ⟩ appears, showing the number of available angles and the angle being shown currently. You can then change the camera angle if you wish.

- Use the ▼/▲ (down/up) keys to select the required angle.
- To go to any angle directly, enter the angle number using the numerical keys 0-9.
  ➜ After a while, playback changes to the selected angle. The angle icon remains displayed until multiple angles are no longer available.

Changing the audio language

- Select ((ʻ (AUDIO) in the menu bar.
- Press AUDIO or ▼/▲ (down/up) keys repeatedly to see the different languages.
- You can enter the required language number directly using the numerical keys 0-9.

Subtitles

- Select [...] (SUBTITLE) in the menu bar.
- Press SUBTITLE or ▼/▲ (down/up) keys repeatedly to see the different subtitles.
- You can enter the required subtitle number directly using the numerical keys 0-9.

Special Video-Features

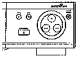
Playback Control (PBC)

- Load a Video CD with PBC and press ▶ PLAY.
  ➜ The PBC menu appears on the TV screen.
- Go through the menu with the keys indicated on the TV screen until your chosen passage starts to play. If a PBC menu consists of a list of titles, you can select a title directly.
- Enter your choice with the numerical keys (0-9).
- Press RETURN to go back to the previous menu.
- You may also select PBC OFF under Personal Preferences.

Enhanced use

Audio Direct Mode

- Audio Direct feature can be activated or deactivated by pressing the AUDIO DIRECT button on front of the player.



This feature will minimise any interaction between the video and audio circuity thereby allowing maximum audio quality produced from the player.

1 Press AUDIO DIRECT button on front of the player.
  ➜ Video section of the SACD player will be "switched off" and pictures will disappear on the TV screen.
2 Press AUDIO DIRECT button again;
  ➜ Pictures will appear on the TV screen.

- The Audio Direct cannot be activated when playing a video disc (e.g. DVD/VCD/SVCD).
- Audio Direct mode will be deactivated whenever the player is switched to standby or off.

When AUDIO DIRECT is switched to ON:

- OSD related keys are disable (e.g. SYSTEM MENU, TITLE, CHAPTER, etc.)
- If a video disc is inserted into the player, audio direct mode will be automatically deactivated and picture will be displayed on the TV screen.

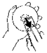
Note:
- *It is recommended that the Audio Direct mode is turned off before you play any video disc.*

- The player will react similar to a CD player. Thus for audio discs (e.g. CDDA, SACD) it is possible use ▶▶I NEXT / I◀◀ PREVIOUS keys for track selection.

Cleaning Discs

Some problems occur because the disc inside the player is dirty. To avoid these problems clean your discs regularly, in the following way:

- When a disc becomes dirty, clean it with a cleaning cloth. Wipe the disc from the centre out, in a straight line.



Caution:
- Do not use solvents such as benzine, thinner, commercially available cleaners, or anti-static spray intended for analog discs.

Diagnostic program

If the player is still faulty you can start the Diagnostic Program in the player.

You can operate the Diagnosis Program by following the step-by-step instructions below.

Instructions

1 Switch the player OFF with the ON/OFF button.
2 Press the ▲ OPEN/CLOSE and II button simultaneously and keep them pressed while you turn the player ON.
  ➜ On the display the message BUSY appears together with a counter that counts down as the test is running, reaching zero by the end of the test.
  ➜ After a few minutes, the message on the local display changes from BUSY to FAIL or to PASS.
  ➜ If the message FAIL appears on the display, there is apparently a failure in your player and your player should be repaired.
3 Consult your dealer or the Philips Customer Care Centre for the nearest Service Repair Shop in your country. The phone number is given in your warranty booklet.
4 If the message PASS appears on the display, there is apparently no failure in your player. In this case the failure can be caused by incorrect interpretation of the operating instructions, the use of a wrong disc or the fact the your player is incorrectly connected. In this case, you should consult your dealer or the Philips Customer Care Centre for further assistance in solving the problem.
5 If the problem remains, return to point 3 of this instruction to find the nearest repair shop.
6 Switch the player OFF with the ON/OFF button to leave the diagnostic program.

Before Requesting Service

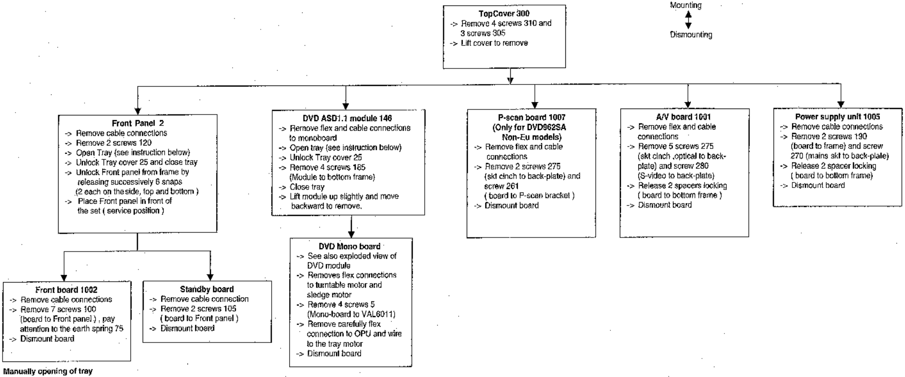
If it appears that the DVD Video player is faulty, first consult this checklist. Something may have been overlooked. Under no circumstances should you attempt to repair the system yourself; this will invalidate the warranty.

Look for the specific symptom(s). Then perform only the actions listed to remedy the specific symptom(s).

Symptom	Remedy
No power	– Make sure the power cord is properly connected. – Check if there is power at the AC outlet by plugging in another appliance.
No sound	– Check audio connections. – If you are using a HiFi amplifier, try another sound source. – DTS-CD do not play on the SACD player.
Distorted sound from HiFi amplifier	– Check to make sure that no audio connections are made to the amplifier's phono input.
Disc can't be played	– Ensure the disc label is facing up. – Clean the disc. – Check if the disc is defective by trying another disc.
No picture	– Check if the TV is switched on. – Check the video connection. – Check if Audio Direct is turned off (only for CD and SACD).
Distorted picture	– Check the disc for fingerprints and clean the disc with a soft cloth, wiping from the center to the edge in a straight line. – Sometimes a small amount of picture distortion may appear. This is not a malfunction.
Completely distorted picture or no Colour with player menu	– The NTSC/PAL switch may be in the wrong status. – Press the ■ STOP and ▶▶I NEXT buttons simultaneously and keep them pressed while you turn the player ON.
No return to start-up screen when disc is removed	– Reset the unit by switching the player OFF, then ON again. – Check to see if the program requires another disc to be loaded.
The player does not respond to the remote control	– Aim the remote control directly at the sensor on the front of the player. – Remove any obstacles between the player and the remote control. – Inspect or replace the batteries in the remote control.
Distorted or black/white picture with DVD or Video CD	– The disc format does not match your TV's video signal (PAL/NTSC).
No audio at digital output	– Check the digital connections. – Check the settings menu to make sure the digital output is set to on. – Check if the audio format of the selected audio language matches your receiver capabilities.
Buttons do not work	– Reset by switching the player OFF then ON again.
Audible 'clicks' from player's internal	– During operation the relais of the player may be switched, leading to an audible 'click'. This is not a malfunction.
Player does not respond to some operating commands during playback	– Operations may not be permitted by the disc. Refer to the instructions of the disc.

Personal notes:

DISMANTLING INSTRUCTIONS – DVD962SA / SACD900
See exploded view for item numbers



TopCover 300
-> Remove 4 screws 310 and 3 screws 305
-> Lift cover to remove

Front Panel 2
-> Remove cable connections
-> Remove 2 screws 120
-> Open Tray (see instruction below)
-> Unlock Tray cover 25 and close tray
-> Unlock Front panel from frame by releasing successively 6 snaps (2 each on the side, top and bottom)
-> Place Front panel in front of the set (service position)

Front board 1002
-> Remove cable connections
-> Remove 7 screws 100 (board to Front panel) , pay attention to the earth spring 75
-> Dismount board

Standby board
-> Remove cable connection
-> Remove 2 screws 105 (board to Front panel)
-> Dismount board

DVD ASD1.1 module 146
-> Remove flex and cable connections to monoboard
-> Open tray (see instruction below)
-> Unlock Tray cover 25
-> Remove 4 screws 185 (Module to bottom frame)
-> Close tray
-> Lift module up slightly and move backward to remove.

DVD Mono board
-> See also exploded view of DVD module
-> Removes flex connections to turntable motor and sledge motor
-> Remove 4 screws 5 (Mono-board to VAL6011)
-> Remove carefully flex connection to OPU and wire to the tray motor
-> Dismount board

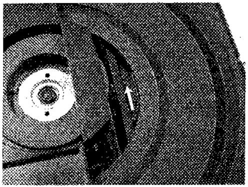
P-scan board 1007 (Only for DVD962SA Non-Eu models)
-> Remove flex and cable connections
-> Remove 2 screws 275 (skt cinch to back-plate) and screw 261 (board to P-scan bracket)
-> Dismount board

A/V board 1001
-> Remove flex and cable connections
-> Remove 5 screws 275 (skt cinch ,optical to back-plate) and screw 280 (S-video to back-plate)
-> Release 2 spacers locking (board to bottom frame)
-> Dismount board

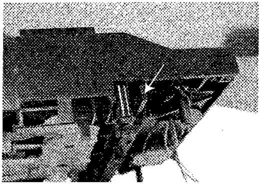
Power supply unit 1005
-> Remove cable connections
-> Remove 2 screws 190 (board to frame) and screw 270 (mains skt to back-plate)
-> Release 2 spacer locking (board to bottom frame)
-> Dismount board

Manually opening of tray

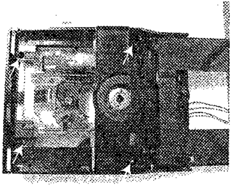
When it is not possible to open the tray with the EJECT button, the tray can manually be opened.
When no disc is loaded, unlock the tray by moving the slide from left to right and pull tray outwards.



When a disc is loaded, unlock the tray by pushing the slide inwards with a screwdriver and pull tray outwards.

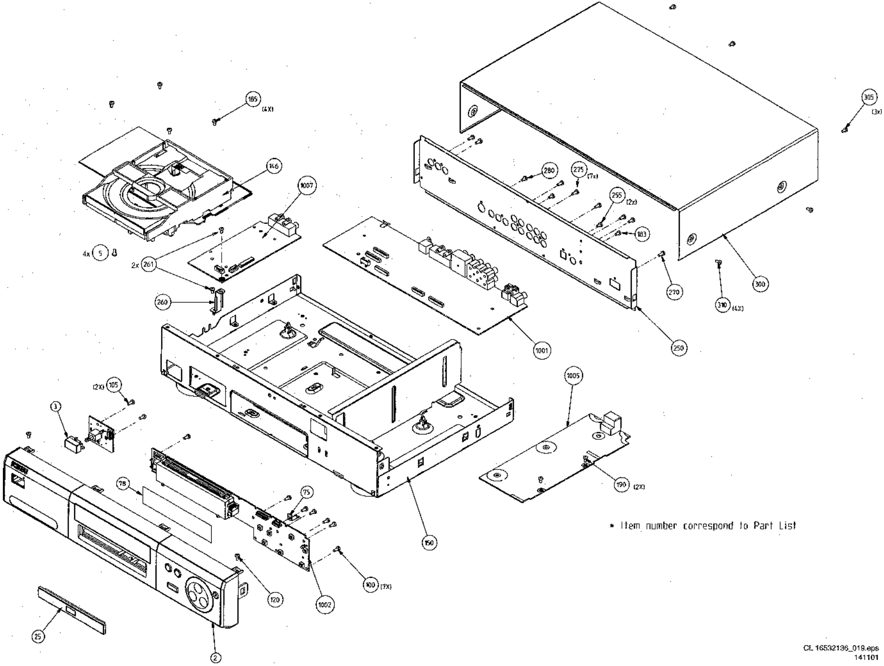


Remove 4 screws to remove loader.



CL 16532136_027.eps
141101

Exploded View


185 (4X)
146
1007
4x 5
2x 261
260
280
275 (7x)
255 (2x)
183
305 (3x)
270
310 (4X)
300
250
1001
1005
190 (2X)
150
(2X) 105
3
78
75
100 (7X)
120
1002
25
2

* Item number correspond to Part List

CL 16532136_019.eps
141101

5. Diagnostic Software Descriptions and Troubleshooting

5.1 Dealerscript

5.1.1 Purpose of Dealer Script

The dealer script can give a diagnosis on a standalone DVD player; no other equipment is needed to perform a number of hardware tests to check if the DVD player is faulty. The diagnosis is simply a "error" or "pass" message; no indication is given of faulty hardware modules. Only tests within the scope of the diagnostic software will be executed hence only faults within this scope can be detected.

5.1.2 Contents of Dealer Script

The dealer script executes all diagnostic nuclei that do not need any user interaction and are meaningful on a standalone DVD player.
The nuclei called in the dealer script are the following (the number after each nucleus name corresponds with the number being on the local display when the nucleus is executed during the dealer script):

Nucleus

Display Countdown	Nucleus Number	Nucleus Name	Description
9	6	PapChksFl	Calculate and verify checksum of FLASH memory
8	12	PapI2cDisp	Checks the I2C interface with the slave processor on the display board
7	13	PapS2bEcho	Checks the I2C interface to the basic engine
6	11	PapI2cNvram	Checks the I2C interface with the NVRAM
5	15	PapNvramWrR	Pattern test of all locations in the NVRAM
4	16	CompSdramWrR	Pattern test of all locations in the SDRAM(s)
3	63a	FURORE-SdramWrRLow	Check on the Furore Sdram interconnection and write-read test
2	63b	FURORE-SdramWrRHigh	
1	66a	DAC-I2C	Check the I2C communication with the IO expander and the audio DAC on the AV board

CL 16532136_028.pdf
051101

Figure 5-1

Dealer Script

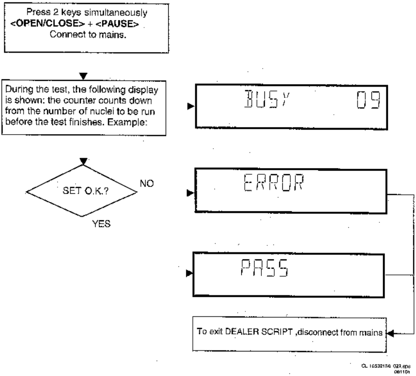

Press 2 keys simultaneously
<OPEN/CLOSE> + <PAUSE>
Connect to mains.
During the test, the following display is shown: the counter counts down from the number of nuclei to be run before the test finishes. Example:
BUSY 09
SET O.K.?
NO
YES
ERROR
PASS
To exit DEALER SCRIPT ,disconnect from mains
CL 16532156 028.eps
081101

Figure 5-2

5.2 Player Script

5.2.1 Purpose of Player Script

The Player script will give the opportunity to perform a test that will determine which of the DVD player's modules are faulty, to read the error log and error bits and to perform an endurance loop test. To successfully perform the tests, the DVD player must be connected to a tv set to check the output of a number of nuclei. For DVDv2b a multi-channel amplifier, a set of 6 speakers and an external video source are necessary to test. To be able to check results of certain nuclei, the player script expects some interaction of the user (i.e. to approve a test picture or a test sound). Some nuclei (e.g. nuclei that test functionality of the Basic Engine module) require that the DVD player itself is opened, to enable the user to observe moving parts and approve their movement visually. Only tests within the scope of the diagnostic software will be executed hence only faults within this scope can be detected.

5.2.2 Contents of Player Script

The player script contains all nuclei that are useful on a DVD player that is connected to a tv-set and help to determine which module of the DVD player is faulty, as well as to read out the contents of the error logs.

5.2.3 Structure of Player Script

The player script consists of a set of nuclei testing the three hardware modules in the DVD player: the Display PWB, the Digital PWB and the Basic Engine.
Nuclei run by the player test need some user interaction; in the next paragraph this interaction is described. The player test is done in two phases:

1. Interactive tests: this part of the player test depends strongly on user interaction and input to determine nucleus results and to progress through the full test. Reading the error log and error bits information can be useful to determine any errors that occurred recently during normal operation of the DVD player.
2. The loop test will loop through the list of nuclei indefinitely, till the player is reset. The list of nuclei is as follows:
    - PapChksFlash
    - PapI2cNvram
    - CompSdramWrR
    - PapS2bEcho
    - PapI2cDisp

For DSW version 1.6 and above, the DSW version number will be displayed on the local display. Press NEXT to continue to the display test.
The display should look like the following:

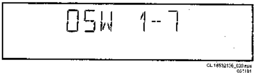

DSW 1-7
CL 16532136_030.eps
051101

Figure 5-3

5.2.4 Survey

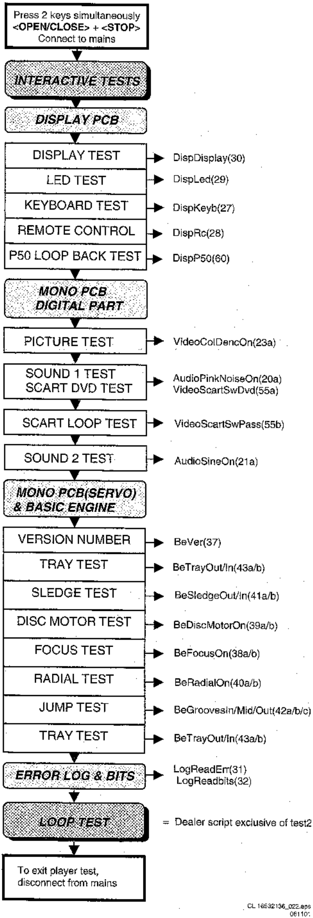
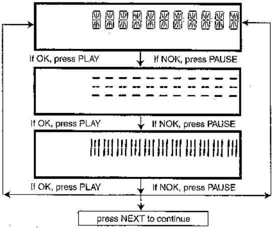

Press 2 keys simultaneously
<OPEN/CLOSE> + <STOP>
Connect to mains
INTERACTIVE TESTS
DISPLAY PCB
DISPLAY TEST
DispDisplay(30)
LED TEST
DispLed(29)
KEYBOARD TEST
DispKeyb(27)
REMOTE CONTROL
DispRc(28)
P50 LOOP BACK TEST
DispP50(60)
MONO PCB DIGITAL PART
PICTURE TEST
VideoColDencOn(23a)
SOUND 1 TEST
SCART DVD TEST
AudioPinkNoiseOn(20a)
VideoScartSwDvd(55a)
SCART LOOP TEST
VideoScartSwPass(55b)
SOUND 2 TEST
AudioSineOn(21a)
MONO PCB(SERVO) & BASIC ENGINE
VERSION NUMBER
BeVer(37)
TRAY TEST
BeTrayOut/In(43a/b)
SLEDGE TEST
BeSledgeOut/In(41a/b)
DISC MOTOR TEST
BeDiscMotorOn(39a/b)
FOCUS TEST
BeFocusOn(38a/b)
RADIAL TEST
BeRadialOn(40a/b)
JUMP TEST
BeGroovesIn/Mid/Out(42a/b/c)
TRAY TEST
BeTrayOut/In(43a/b)
ERROR LOG & BITS
LogReadErr(31)
LogReadbits(32)
LOOP TEST
= Dealer script exclusive of test2
To exit player test, disconnect from mains
CL 16532136_022.eps
061101

Figure 5-4

5.3 Display PCB

5.3.1 Display Test

The display test is performed by nucleus DispDisplay. By putting a series of test patterns on the local display, the local display is tested. To step through all different patterns, the user must either press PLAY (pattern is ok) or PAUSE (pattern was incorrect) to proceed to the next pattern. The display of patterns is continued in a cyclic manner, shown in Fig. 5-5, until the user presses NEXT. If the user presses NEXT before all display patterns are tested, the DispDisplay nucleus will return FALSE (display test unsuccessful).



CL 16532136_035.eps
061101

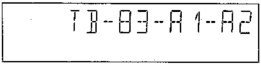
Figure 5-5

5.3.2 LED Test

The LED(s) on the DVD player is (are) tested by nucleus DispLed. The user must check if the LED(s) is (are) lighted; if it is, press PLAY, if it is not, press PAUSE. By pressing NEXT the script will proceed to the next test. If the user presses NEXT before PLAY or PAUSE, the DispLed nucleus will return TRUE (LED test successful).

5.3.3 Keyboard Test

The keyboard of the DVD player is tested by nucleus DispKeyb. The user is expected to press all keys on the local keyboard once. The code of the key pressed is shown on the local display (1 hexadecimal digit) immediately followed by a (hexadecimal) number indicating how many times that key has been pressed. Example of the local display during this test:



CL 96532065_007.eps
120799

Figure 5-6

The key-codes displayed on the local display will scroll from right to left when the display gets full, the text "tb-" will remain on display.

Key ID	Key
0	PLAY
1	NEXT
2	PREVIOUS
3	PAUSE
4	STOP
5	OPEN / CLOSE
6	AUDIO / DIRECT

CL 16532136_032.pdf
051101

Figure 5-7

If any keys are detected more than once (due to hardware error), the key-code is displayed twice (or more), with the second digit increased by 1.

If the user does not press all keys minimally once (in any order), the DispKeys nucleus will return FALSE and cause an error in the overall result of the player script.

The user can leave the keyboard test by pressing the NEXT key on the local display of the DVD player for at least one full second.

The result of the keyboard test is shown on local display as follows:

CL 96532065_009.eps
120799

Figure 5-8

Or

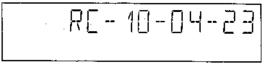
CL 96532065_010.eps
120799

Figure 5-9

Pressing NEXT on the local keyboard again will proceed to the next text.

5.3.4 Remote Control Test

The remote control of the DVD player is tested by nucleus DispRc. The user must press any key on the remote control just once. The codes of the key pressed will be shown on the local display in hexadecimal format. Example:



CL 96532065_011.eps
120799

Figure 5-10

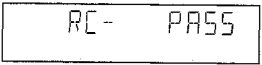
In this example 23 is the hexidecimal code of the pressed RC key. The user can leave the remote-control test by pressing NEXT on the local keyboard of the DVD player. The remote control test is successful if a code was received before the user pressed the NEXT key; pressing the NEXT key before pressing a key on the remote control gives an error in the remote control test (note that the remote control test will also fail if a key on the remote control was pressed but no code was received). The remote control test does not check upon the contents of the received code, that is it will not be checked if the received code matches the key pressed. If desired, the user can manually check this code by using a code-table for the remote control key-codes.

RC Key id	Hexadecimal code
STANDBY	0C
T-C	C8
RESUME	D7
FTS	FB
SOUND MODE	80
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
0	0
RETURN	83
DISPLAY DIM	13
DISC MENU	54
SYSTEM MENU	82
CURSOR UP	58
CURSOR DOWN	59
CURSOR LEFT	5A
CURSOR RIGHT	5B
OK	5C
PREVIOUS	21
NEXT	20
STOP	31
PLAY	2C
PAUSE	30
SUBTITLE	4B
ANGLE	85
ZOOM	F7
AUDIO	4E
REPEAT	1D
REPEAT A-B	3B
SHUFFLE	1C
SCAN	2A

CL 16532136_033.pdf
051101

Figure 5-11

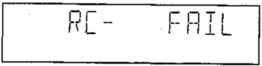
After pressing NEXT, the result of the remote control test is displayed on the local display of the DVD player as follows:



CL 96532065_013.eps
120799

Figure 5-12

Or



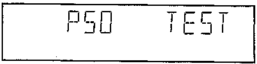
CL 96532065_014.eps
120799

Figure 5-13

Pressing NEXT on the local keyboard again will proceed to the next test.

5.3.5 P50 Loop-Back Test

For the P50 loop-back test, the user must first press a key to decide if the test is to be performed.
The display will show the following message:

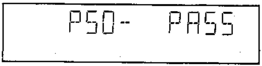


CL 16532007_004.eps
010201

Figure 5-14

If the user presses PAUSE, the P50 test will be skipped.
If the user presses PLAY, the P50 test is performed and the result is displayed as follows:

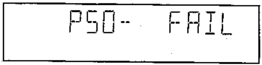
Test successfull:



CL 16532007_005.eps
010201

Figure 5-15

Test fails:



CL 16532007_006.eps
010201

Figure 5-16

Press the NEXT key to continue to the next text

5.4 Mono PCB Digital Part

5.4.1 Picture Test

The picture test is performed by putting a predefined picture (colour bar) on the display (nucleus VideoColDencOn) and asking the user for confirmation. The display will show the following message:

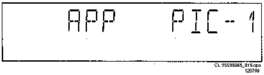


Figure 5-17

By pressing PLAY the user confirms the test, pressing PAUSE will indicate the picture was invisible or incorrect. Pressing NEXT will proceed to the next test

5.4.2 Sound 1 & SCART DVD Test

The first soundtest is performed by starting a pink noise sound that needs confirmation from the user (nucleus AudioPinkNoiseOn); the display will show the following message very shortly:

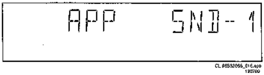


Figure 5-18

After starting up sound 1, SCART loop-trough will be simultaneously active during this test. SCART loop-through will be measured with the aid of an external video source. When entering the SCART loop-through, the local display indicates:

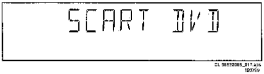


Figure 5-19

On the TV screen a colour bar (generated by nucleus VideoColDencOn) is visual and the internally generated pinknoise is audible. By pressing PLAY the user confirms the test, pressing PAUSE will indicate the sound was inaudible or incorrect. Pressing NEXT will proceed to the next test; if the user presses NEXT without pressing PLAY or PAUSE first, the result of this test will be TRUE (sound ok). By pressing the NEXT button there will be switched over to the external source, this must become now visible on the TV screen (using the SCART). The local display indicates:

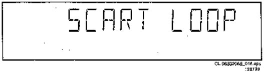


Figure 5-20

The internally generated colour bar is still available on the CVBS and Y/C outputs. And the pinknoise-signal is still available on the cinch audio outputs. By pressing the NEXT button, the internal generated colour bar becomes visual again. The test can be left by pressing the NEXT key for more than one second.

5.4.3 Sound 2 Test

The second soundtest is performed by producing a sine sound (nucleus AudioSineOn). The signal can be stopped by pressing the STOP-key. The display will show the following message:

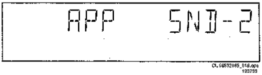


Figure 5-21

After the audio signal has been stopped, by pressing PLAY the user confirms the test, pressing PAUSE will indicate that something went wrong. Pressing NEXT will proceed to the next; if the user presses NEXT without pressing PLAY or PAUSE first, the result of this test will be TRUE (sound ok).

5.5 Basic Engine

5.5.1 Version Number

In the basic engine tests, the version number of the Basic Engine will be shown first, as the following example:

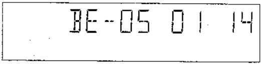


Figure 5-22

By pressing the NEXT key, the Basic Engine tests are started.

5.5.2 Tray Test

First, the tray is tested. The purpose of this test is also to give the user the opportunity to put a disc in the tray of the DVD player. Some tests on the Basic Engine require that a disc(e.g. DVD MPTD test disc) is present in the player. At the end of the Basic Engine tests this tray test will be repeated solely to enable the user to remove the disc in the tray. The local display will look as follows:

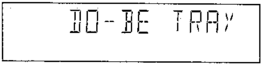


Figure 5-23

By pressing PLAY or PAUSE the user can toggle the position of the tray. Note that this test will not contribute to the test result of the Basic Engine. Pressing NEXT will proceed to the next test, after the tray has been closed by the software if it was open.

5.5.3 Sledge Test (Visual Test)

The second Basic Engine test tests the sledge; the user can move the sledge as many times as desired by using PLAY (nucleus BeSledgeOut) and PAUSE (nucleus BeSledgeIn). Pressing NEXT on the local keyboard proceeds to the next test. Note that this test will not contribute to the test result of the Basic Engine. The local display will look as follows during the sledge test:

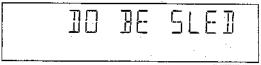


Figure 5-24

5.5.4 Disc Motor Test (Visual Test)

The third Basic Engine test tests the disc motor (nucleus BeDiscMotorOn); the local display looks as follows:

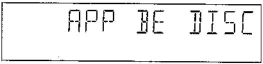


Figure 5-25

By pressing PLAY the user confirms that the disc motor is running; pressing PAUSE indicates the disc motor does not work. Pressing NEXT proceeds to the next test, after a reset of the disc motor (nucleus BeDiscMotorOff). If the user presses NEXT before pressing PLAY or PAUSE, the result of this test will be TRUE (disc motor is running).

5.5.5 Focus Test (Visual Test)

The fourth Basic Engine test tests the focussing; first focussing is turned on by calling nucleus BeFocusOn. The display will look as follows:

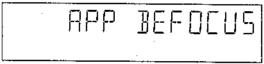


Figure 5-26

By pressing PLAY the user confirms that the focussing was succesful; pressing PAUSE indicates a focussing failure. Pressing NEXT proceeds to the next test after a reset of the focussing (nucleus BeFocusOff); if NEXT is pressed before PLAY or PAUSE, the result of this test will be TRUE (focus successful).

5.5.6 Radial Test (Visual & Listening Test)

The fifth Basic Engine test tests the radial functionality (nucleus BeRadialOn); the local display looks as follows:

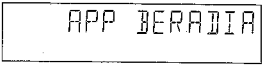


Figure 5-27

By pressing PLAY the user confirms that the radial function worked; pressing PAUSE indicates the function does not work. Pressing NEXT proceeds to the next test, after a reset of the radial (nucleus BeRadialOff). If the user presses NEXT before pressing PLAY or PAUSE, the result of this test will be TRUE (radial successful).

5.5.7 Jump Test (Listening Test)

The sixth and last Basic Engine test tests the jumping by calling nuclei BeGroovesIn, BeGroovesMid and BeGroovesOut. During this test, the local display looks as follows:

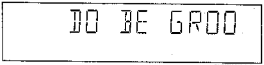


Figure 5-28

The user can switch between the three different types of groove settings by pressing PLAY (forward to next nucleus in the list In-Mid-Out) or PAUSE (backward in the list In-Mid-Out). This is done in a cyclic manner; note that this test will not contribute to the test result of the Basic Engine. Pressing NEXT proceeds to the next test, after the disc motor has been shut off with a call to nucleus BeDiscMotorOff.

5.5.8 Tray Test

As a last action for the Basic Engine tests, the tray test is repeated. The local display will look as follows:

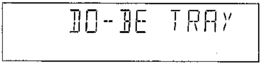


Figure 5-29

This test is meant to give the user the opportunity to remove the disc in the tray. The tray position can be toggled using the PLAY and PAUSE key. The tray will be closed (by the software, if it is open) before proceeding to the next test when the user presses the NEXT key.

5.5.9 Error Log (See Table on Page 28)

Reading the error log and error bits information can be useful to determine any errors that occurred recently during normal operation of the DVD player. Reading the error log is done by nucleus LogReadErr. The display during the errorlog readout looks as follows :

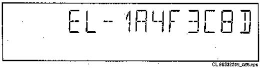


Figure 5-30

By pressing PLAY or PAUSE the user can move forward or backward (respectively) through the logged error codes. The highlighted number indicates which errorcode is currently on display (in the example above, errorcode number 4 is displayed). If "0000" is displayed at all positions, the error log is empty. Display of the logged errors is done in a cyclic manner. The errorcode with the lowest highlighted number is the most recent. By pressing NEXT on the local keyboard, the user can proceed to the next test.

5.5.10 Error Bits

Reading the error bits is done by nucleus LogReadBits. The display during the errorbits readout looks as follows:

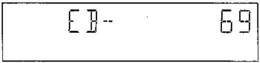


Figure 5-31

Only the set errorbits will be shown by their (decimal) number. Refer to the appropriate documentation for the explanation of each bit number. If the display only shows "EB-0", no error bits were set. By pressing NEXT the user can continue to the next test.

5.6 Loop Test (See Table Below)

At the start of the loop test, the display will show the result of the interactive player test:

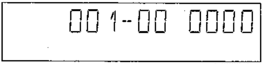


Figure 5-32

The left side of the display contains a 3-digit code, which can have a value between 000 and 111. These values are to be interpreted as follows:

Displayed Value	Indication for each module		
	Basic Engine	Mono PCB	Display PCB
000	ok	ok	ok
001	ok	ok	faulty
010	ok	faulty	ok
011	ok	faulty	faulty
100	faulty	ok	ok
101	faulty	ok	faulty
110	faulty	faulty	ok
111	faulty	faulty	faulty

Figure 5-33

The loop test will perform the same nuclei as the dealer test, but it will loop through the list of nuclei indefinitely. The display of the DVD player will display not only the three digits indicating correct/faulty modules and the last found error code (as mentioned, faults are detected as far as they can be within the scope of the diagnostic software), but also a loop counter indicating how many times the loop has been gone through. Example:

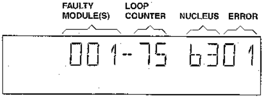


Figure 5-34

The number after the hyphen indicates the number of times the loop test has been performed; the 4 digits at the right side of the display show the last error that was found when running the loop test: the leftmost two digits of this code indicates which nucleus resulted in a fault; the rightmost two digits refer to the faultcode within that nucleus. For further explanation of this error code, refer to chapter 5.8 Nuclei Error Codes.

5.6.1 Errorlog

Explanation:

The application errors will be logged in the NVRAM. The maximum number of error bytes that will be visible is 16. The first word (4 digits) of the byte is the component identification; the last word is the error code.

The diagnostics software will present a combination of this component identification plus an error code on the local display (and on the attached terminal). The last reported error is shown as < 00000000, the oldest visible error as 00000000> and the errors in between as < 00000000 >.

The devices that may report errors are the serial controller (UART), the basic engine (BE), the slave processor (SLPH), the SACD Stream Manager (SSM) and the SACD Media Access (SMA). The identification of these components is as follows:

Component name	Component identification
Serial controller (UART)	000A
Engine (BE)	0016
Slave Processor (SLPH)	001A
SACD Stream Manager (SSM)	001C
SACD Media Access (SMA)	002E
Diagnostic software (DS)	Dxxx

The tables in the next chapters list the error code and corresponding problem. The column 'Explanation' holds a more elaborate description and the most likely reason for the error.

Some Examples:

002E0000 (SMA reported a timeout error
0016010A (Engine could not fully close or open the tray
D0010001 (Flash checksum failed (for other DS errors, see description of nucleui error codes in paragraph 5.4.

UART Error Codes

Error Number	Error name	Explanation
0000	BUF_OVERFLOW	To many characters were offered in too little time. Reason: system was too busy doing other jobs.
0001	COMMUNICATION	Usually a protocol error. Reason: bad connection between engine and processor.

BE errors

Error Number	Error name	Explanation
0101	S2B_ILL_COMMAND	Parameter(s) not valid for this command. Reason: some communication problem between UART and engine.
0102	S2B_ILL_PARAM	Command not allowed in this state or unknown. Reason: see S2B_ILL_COMMAND error
0103	S2B_SLEDGE	Sledge could not be moved to home position.
0104	S2B_FOCUS	Focus failure
0105	S2B_MOTOR	Motor could not reach speed within timeout
0106	S2B_RADIAL	Servo didn't get on track after several retries.
0107	S2B_PLL_LOCK	PLL could not lock in Accessing or Tracking state
0108	SBC_HEADER_TO	Header timeout
0109	S2B_SBC_NOT_FOUND	Requested subcode item could not be found.
010A	S2B_TRAY	Tray could not be opened or closed completely.
010B	S2B_TOC_READ	TOC could not be read within timeout period.
010C	S2B_JUMP	Requested seek could not be performed.
010D	S2B_NON_EXIST_SES	Attempt to access a non-existing session.
010E	S2B_NON_EXIST_BCA	
01F0	S2B_OVERRUN	Too many bytes received over S2B Reason: see S2B_ILL_COMMAND error
01F1	S2B_COMM_TO	Not enough bytes are received over S2B Reason: see S2B_ILL_COMMAND error
01F2	S2B_PARITY	Byte received with parity error. Reason: see S2B_ILL_COMMAND error
01F3	S2B_ILL_PHASE	CMD IDC is not valid, transmission out of sync. Reason: see S2B_ILL_COMMAND error
01F4	S2B_ILL_NR_OF_BYTES	Byte count has an illegal value. Reason: see S2B_ILL_COMMAND error

SLPH Error Codes

Error Number	Error name	Explanation
0000	COMMUNICATION	Error in I2C communication. Reason: bad connection between slave processor and main processor.

SSM Error Codes

Error Code	Error name	Explanation
0006	SP_SYNCERROR	System cannot get synchronised with sectors coming from disc. Reason: Usually a damaged disc or the player was dropped/ pushed during operation. If not, the engine is malfunctioning.
0007	SP_EDCERROR	Data coming from disc is damaged. Reason: see SP_SYNCERROR
0008	SP_CONTINUITYERROR	Sequence of sectors coming from disc is incorrect. Reason: see SP_SYNCERROR
0009	DMX_CONTINUITYERROR	Sequence of sectors is incorrect. Reason: problem with buffer RAM
000A	LLD_ERROR	An illegal audio format was offered to the decoder. Reason: unknown audio type on disc or problem with buffer RAM
000B	BCU_ERROR	Internal problem in Furore chip

SMA Error Codes

Error Number	Error name	Explanation
0000	SMA_TIMEOUTERROR	Data coming from disc not in time. Reason: damaged disc or engine problem.

5.6.2 Servicing DVD Loader

The DVD Loader / mechanism, VAL6011, has to be exchanged completely in case of failure. A new mechanism can be ordered with codenumber 9305 023 61104.

5.6.3 Reprogramming of New Mono Boards.

Caution

This information is confidential and may not be distributed. Only a qualified service person should reprogram the mono board.

After reset of NV-memory or repair of the mono board, all the customer settings and also the region code will be lost.
Reprogramming of the mono board will put the player back in the state in which it has left the factory, i.e. with the default settings and the allowed region code.
Reprogramming is limited to 25 times.
When the counter reaches 25, reprogramming is not possible anymore.
Reprogramming will be done by way of the remote control.
Put the player in stop mode, no disc loaded.
Press the following keys on the remote control;
<***PLAY***> followed by numerical keys ***<1> <5> <9>***
The display shows: "- - - - - - - - - - - -
Press now successively the following keys :

for SACD 900 /171	: ***<0><0><3> <0><0><0><0><0><0><0><0><0>***
for DVD962SA /001	***<0><0><1> <0><0><0><0><0><0><0><0><0>***
for DVD962SA /171	***<0><1><3> <0><0><0><0><0><0><0><0><0>***
for DVD962SA /691	***<0><1><4> <0><0><0><0><0><0><0><0><0>***

Press <***PLAY***> again.
The TV screen will become BLUE during a short time to confirm that the mono board has been reprogrammed.

CL 16532138_036.eps
281101

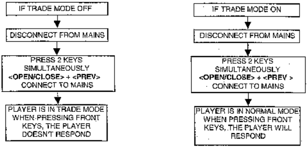
Figure 5-35

5.6.4 Trade Mode

After the player has been powered up for test by the dealer, it would have gone through the Virgin Mode. It is possible to reset the settings made during that mode before the delivery of player to the customer. This can be done as shown in the following diagram:

TRADE MODE

When the player is in Trade Mode, the player cannot be controlled by means of the front key buttons, but only by means of the remote control.



IF TRADE MODE OFF
DISCONNECT FROM MAINS
PRESS 2 KEYS SIMULTANEOUSLY <OPEN/CLOSE> + <PREV> CONNECT TO MAINS
PLAYER IS IN TRADE MODE WHEN PRESSING FRONT KEYS, THE PLAYER DOESN'T RESPOND
IF TRADE MODE ON
DISCONNECT FROM MAINS
PRESS 2 KEYS SIMULTANEOUSLY <OPEN/CLOSE> + <PREV > CONNECT TO MAINS
PLAYER IS IN NORMAL MODE WHEN PRESSING FRONT KEYS, THE PLAYER WILL RESPOND

CL16532138_037.eps
281101

Figure 5-36

5.7 Menu and Command Mode Interface

5.7.1 Layout of Results Diagnostic Nuclei

Results returned from a Diagnostic Nucleus will be displayed in the following layout:
< number >< string > [ok | ER]

< number >: is a 4-digit decimal number padded with leading zeros if its value is less than 4 digits. The first 2 digits identify the generating nucleus (or group of nuclei) while the latter 2 digits indicate the error number.

< string >: is a text string containing information about the result of the Diagnostic Nucleus.

< number > and < string > are defined in [SSD_DN] in the output sections of each Nucleus.

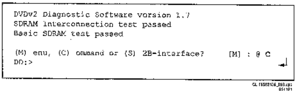
Examples:
1. 0001Unknown command ER @
2. 3100OK @
3. 0901Data line X is not connected to the DRAM ER@

5.7.2 Command Mode Interface

Set-up Physical Interface Components
Hardware required:
- Service PC
- one free COM port on the Service PC
- special cable to connect DVD player to Service PC

The service PC must have a terminal emulation program (e.g. OS2 WarpTerminal or Procomm) installed and must have a free COM port (e.g. COM1). Activate the terminal emulation program and check that the port settings for the free COM port are: 19200 bps, 8 data bits, no parity, 1 stop bit and no flow control. The free COM port must be connected via a special cable to the RS232 port of the DVD player. This special cable will also connect the test pin, which is available on the connector, to ground (i.e. activate test pin).
Code number of PC interface cable: 3122 785 90017

Activation
Switch the player on and the following text will appear on the screen of the terminal (program):



```
DVDv2 Diagnostic Software version 1.7
SDRAM interconnection test passed
Basic SDRAM test passed

(M) enu, (C) ommand or (S) 2B-interface?     [M] : @ C
DD:>
```

Figure 5-37

The first line indicates that the Diagnostic software has been activated and contains the version number. The next lines are the successful result of the SDRAM interconnection test and the basic SDRAM test. The last line allows the user to choose between the three possible interface forms. If pressing C has made a choice for Command Interface, the prompt ("DD>") will appear. The diagnostic software is now ready to receive commands. The commands that can be given are the numbers of the nuclei.

Command Overview of Nuclei
The following table gives an overview of all available nuclei. The first column contains an identification number, the second contains the name of a nucleus and the last column indicate the description of the nucleus.
Note: User confirmation is necessary during front panel tests

Basic Diagnostic Nuclei

Ref. #	Reference Name	Remark
1	BasicSpAcc	Serial port Access test/ initialization
2a	BasicInterconDram	Data and address bus interconnection (only for DVDv2A)
2b	BasicInterconSdram	Data and address bus interconnection
3	BasicDramWrR	DRAM Write Read (only for DVDv2A)
4	BasicSdramWrR	SDRAM Write Read
5	BasicSramWrR	SRAM Write Read

Processor and Peripherals

Ref. #	Reference Name	Remark
6	PapChksFl	Checksum FLASH
7a	PapUclkAclkCdda	uClock A_CLK in CD-DA mode
7b	PapUclkAclkDvd	uClock A_CLK in DVD mode
7c	PapUclkAclkDvd96	uClock A_CLK in DVD (96kHz) mode
8a	PapSgsAclkCdda	Internal PLL CLK in CD-DA mode
8b	PapSgsAclkDvd	Internal PLL CLK in DVD mode
8c	PapSgsAclkDvd96	Internal PLL CLK in DVD (96kHz) mode
9	PapDramWrR	DRAM Write Read (only for DVDv2A)
10	PapFlashWrAcc	FLASH Write Access
11	PapI2cNvram	I2C NVRAM access
12	PapI2cDisp	I2C Display PWB
13	PapS2bEcho	S2B Echo
14	PapS2bPass	S2B Pass-through
15	PapNvramWrR	NVRAM Write Read
62	PapChksSum	Show checksums stored in flash
65	FURORE_Id	Check version ID of Furore chip (Only version 1.7)

Components

Ref. #	Reference Name	Remark
16	CompSdramWrR	SDRAM Write Read
63a	FURORE_SdramWrRLow	Furore SDRAM interconnection + Write Read (Only version 1.7)
63b	FURORE_SdramWrRHigh	Furore SDRAM interconnection + Write Read (Only version 1.7)
64a	FURORE_SdramWrRLowFast	Furore SDRAM interconnection (Only version 1.7)
64b	FURORE_SdramWrRHighFast	Furore SDRAM interconnection (Only version 1.7)

Audio

Ref. #	Reference Name	Remark
18a	AudioDeemp0On AudioDeempOn (DVD2B)	Audio De-emphasis 0 On Audio De-emphasis On (DVDv2B)
18b	AudioDeemp0Off AudioDeempOff (DVD2B)	Audio De-emphasis 0 Off Audio De-emphasis Off (DVDv2B)
18c	AudioDeemp1On	Audio De-emphasis 1 On (Not for DVDv2B)

Ref. #	Reference Name	Remark
18d	AudioDeemp1Off	Audio De-emphasis 1 Off (Not for DVDv2B)
18e	AudioDeemp0TristateOn (DVD2B)	Audio De-emphasis 0 in tristate/bidirectional mode (DVDv2B)
18f	AudioDeemp0TristateOff (DVD2B)	Audio De-emphasis 0 back in output mode (Off) (DVDv2B)
18g	AudioDeemp1TristateOn (DVD2B)	Audio De-emphasis 1 in tristate/bidirectional mode (DVDv2B)
18h	AudioDeemp1TristateOff (DVD2B)	Audio De-emphasis 1 back in output mode (Off) (DVDv2B)
19a	AudioMuteOn	Audio Mute On
19b	AudioMuteOff	Audio Mute Off
20a	AudioPinkNoiseOn	Audio Pinknoise On
20b	AudioPinkNoiseOff	Audio Pinknoise Off
21a	AudioSineOn	Audio Sine signal On/Off
21b	AudioSineBurst	Audio Sine signal Burst
56a	AudioDeemp0On (DVD2B)	PIO-pins as used in 2A for Deemphasis (DVD2B)
56b	AudioDeemp0Off (DVD2B)	PIO-pins as used in 2A for Deemphasis (DVD2B)
56c	AudioDeemp1On (DVD2B)	PIO-pins as used in 2A for Deemphasis (DVD2B)
56d	AudioDeemp1Off (DVD2B)	PIO-pins as used in 2A for Deemphasis (DVD2B)

Video

Ref. #	Reference Name	Remark
23a	VideoColDencOnPAL	Colourbar (PAL) DENC On
23b	VideoColDencOff	Colourbar DENC Off
23c	VideoColDencOnNTSC	Colourbar (NTSC) DENC On
25a	VideoScartLo	Scart Low
25b	VideoScartMi	Scart Medium
25c	VideoScartHi	Scart High
52	VideoColSetupCom	Colour Setup Communication
53a	VideoColSetupHi	Colour Setup High
53b	VideoColSetupLo	Colour Setup Low
54	VideoScartSwComm	Scart Switch communication
55a	VideoScartSwDvd	Scart Switch Dvd
55b	VideoScartSwPass	Scart Switch Pass-through
57a	VideoScartPinLo	PIO-pins as used in 2A for Scart-switching
57b	VideoScartPinMi	PIO-pins as used in 2A for Scart-switching
57c	VideoScartPinHi	PIO-pins as used in 2A for Scart-switching
61a	VideoColOutRGB (ST5508)	Output RGB from ST5508
61b	VideoColOutYUV (ST5508)	Output YUV from ST5508

Display PWB (Slave Processor)

Ref. #	Reference Name	Remark
26	DispVer	Version number
27	DispKeyb	Keyboard
28	DispRc	Remote Control
29	DispLed	LEDs
30	DispDisplay	Display
60	DispP50	P50 loopback test

Log (Error Logging In NVRAM)

Ref. #	Reference Name	Remark
31	LogReadErr	Read last Errors
32	LogReadBits	Read errors Bits
33	LogReset	Reset

Miscellaneous

Ref. #	Reference Name	Remark
34	MiscReadConfig	Read Configuration area from NVRAM
35	MiscNvramReset	NVRAM Reset
36	MiscNvramMod	Modify NVRAM contents
45a	MiscPalNtscHi	Check if PAL/NTSC line is high (For DVDv2A)
45b	MiscPalNtscLo	Check if PAL/NTSC line is low (For DVDv2A)
46	MiscApplVer	Read version of application software
47a	MiscTrayOpenNr	Read the number of times the tray opened
47b	MiscPowerOnTime	Read the total time the player's power has been on
47c	MiscPlayTimeCddaVcd	Read the Playtime of CDDA and VCD discs
47d	MiscPlayTimeDvd	Read the Playtime of DVD discs

Basic Engine

Ref. #	Reference Name	Remark
37	BeVer	Version number
38a	BeFocusOn	Focus On
38b	BeFocusOff	Focus Off
39a	BeDiscmotorOn	Discmotor On
39b	BeDiscmotorOff	Discmotor Off
40a	BeRadialOn	Radial control On
40b	BeRadialOff	Radial control Off
41a	BeSledgeIn	Sledge Inwards
41b	BeSledgeOut	Sledge Outwards
42a	BeGroovesIn	jump Grooves to Inside
42b	BeGroovesMid	jump Grooves to Middle
42c	BeGroovesOut	jump Grooves to Outside
43a	BeTrayIn	Tray In
43b	BeTrayOut	Tray Out
44	BeReset	Reset Basic Engine
58a	LaserCdOn	CD Laser on
58b	LaserCdOff	CD Laser off
58c	LaserDvdOn	DVD Laser on
58d	LaserDvdOff	DVD Laser off
59	AudioDtsCheckComm	Check I2C communication with Motorola DSP chip

Karaoke

Ref. #	Reference Name	Remark
48a	KaraokeModeOff	Switch Karaoke mode off
48b	KaraokeModeOn	Switch Karaoke mode on
49	KaraokeMicInput	Check path from the microphone input to audio output
50a	KaraokeKeyOn	Set Karaoke Key to the maximum level (1200 cent)
50b	KaraokeKeyOff	Set Karaoke Key to flat octave (0 cent)
51a	KaraokeEchoOn	Set Echo Control fuction on
51b	KaraokeEchoOff	Set Echo Control function off

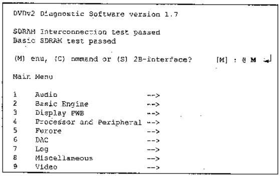
SACD2001 AV Board (Only for Version 1.7)

Ref. #	Reference Name	Remark
66a	DAC_I2C	I2C DAC, IO expander
66b	DAC_I2CEnable	Set I2C_ENABLE line on
66c	DAC_I2CDisable	Set I2C_ENABLE line off
67a	DAC_ClockInternal	Route internal clock to DAC
67b	DAC_ClockExternal	Route external clock to DAC
67c	DAC_ClockFrequency SACD	Select external clock as 192*fs
67d	DAC_ClockFrequency CDDA	Select external clock as 384*fs
68a	DAC_DSDStreamSel	Set DSD_PCM to high
68b	DAC_PCMStreamSel	Set DSD_PCM to low
69a	DAC_BaseNormal	Set BASEMGT to high
69b	DAC_BaseMgt	Set BASEMGT to low
70	DAC_Reset	Reset audio DACs
71a	DAC_ModeCDDA	Set audio DACs to CDDA mode
71b	DAC_ModeDVD48	Set audio DACs to DVD48 mode
71c	DAC_ModeDVD96	Set audio DACs to DVD96 mode
71d	DAC_ModeDSD	Set audio DACs to DSD mode

5.7.3 Menu Mode Interface

Activation

Switch the player on and the following text will appear on the screen of the terminal (program):



```
DVDv2 Diagnostic Software version 1.7

SDRAM Interconnection test passed
Basic SDRAM test passed

(M) enu, (C) ommand or (S) 2B-interface?      [M] : @ M ↵

Main Menu

1     Audio                       -->
2     Basic Engine                -->
3     Display PWB                 -->
4     Processor and Peripheral    -->
5     Furore                      -->
6     DAC                         -->
7     Log                         -->
8     Miscellaneous               -->
9     Video                       -->
```

CL 12552135_004.eps
051101

Figure 5-38

The first line indicates that the Diagnostic software has been activated and contains the version number. The next lines are the successful result of the SDRAM interconnection test and the basic SDRAM test. The last line allows the user to choose between the three possible interface forms. If pressing M has made a choice for Menu Interface, the Main Menu will appear.

Layout of Menu and Submenu

The following menu layout will appear after starting up the SACD player in menu mode. The symbol → indicates that the current menu choice will invoke the display of a submenu. The number between [ ] idicates the nucleus number. These numbers will not be shown on the screen.

Menus

MAIN MENU

1. Audio-->
2. Basic Engine-->
3. Display PWB-->
4. Processor & Peripherals -->
5. Furore-->
6. DAC-->
7. Log-->
8. Miscellaneous-->
9. Video-->

First Level Submenus

AUDIO MENU

1. Deemphasis-->
2. Mute-->
3. PinkNoise-->
4. SineWave-->

BASIC ENGINE MENU
1. Disc Motor-->
2. Focus-->
3. Grooves-->
4. Radial-->
5. Reset[44]
6. Sledge-->
7. Tray-->
8. Version[37]
9. Laser-->

DISPLAY PWB MENU
1. Display[30]
2. Keyboard[27]
3. LEDs[29]
4. Remote control[28]
5. Version[26]
6. P50[60]

PROCESSOR AND PERIPHERALS MENU
1. Clock-->
2. Flash-->
3. I2C-->
4. S2B-->
5. SDRAM Write/Read[16]

FURORE
1. SDRAM Write/Read Low[63a]
2. SDRAM Write/Read High[63b]
3. SDRAM Write/Read Fast Low[64a]
4. SDRAM Write/Read Fast High[64b]
5. Version[65]

DAC MENU
1. DAC Reset[70]
2. I2C Test-->
3. Clock-->
4. Stream select-->
5. Base Mgt-->
6. DAC mode-->

LOG MENU
1. Read last errors[31]
2. Read error bits[32]
3. Reset[33]

MISCELLANEOUS MENU
1. NVRam Utils-->
2. 2B Utils-->
3. Statistics Info-->
4. Read Application Version[46]

VIDEO MENU
1. Colourbar-->
2. Scart-->

Second level submenus

DEEMPHASIS MENU
1. KOK_Bypass On [56a]
2. KOK_Bypass Off [56b]
3. Centre_On On[56c]
4. Centre_On On[56d]
5. KOK_Bypass Tristate On[18e]
6. KOK_Bypass Tristate Off [18f]
7. Centre_On Tristate On [18g]
8. Centre_On Tristate Off[18h]

MUTE MENU
1. Mute On[19a]
2. Mute Off[19b]

PINKNOISE MENU
1. Pinknoise On[20a]
2. Pinknoise Off[20b]

SINEWAVE MENU
1. 1. Audio Sine On[21a]
2. 2. Audio Burst On[21b]

DISC MOTOR MENU
1. Disc Motor On[39a]
2. Disc Motor Off[39b]

FOCUS MENU
1. Focus On[38a]
2. Focus Off[38b]

GROOVES MENU
1. Jump Grooves to Inside[42a]
2. Jump Grooves to Middle[42b]
3. Jump Grooves to Outside[42c]

RADIAL MENU
1. Radial Control On[40a]
2. Radial Control Off[40b]

SLEDGE MENU
1. Sledge Inwards[41a]
2. Sledge Outwards[41b]

TRAY MENU
1. Open Tray[43b]
2. Close Tray[43a]

LASER MENU
1. CD Laser On[58a]
2. CD Laser Off[58b]
3. DVD Laser On[58c]
4. DVD Laser Off[58d]

UCLOCK MENU
1. uClock EXT_CLK in CDDA Mode[7a]
2. uClock EXT_CLK in DVD Mode[7b]
3. uClock EXT_CLK in DVD 96 kHz Mode[7c]

FLASH MENU
1. Checksum FLASH[6]
2. Show Checksum FLASH[62]
3. 1st Flash write access[10a]
4. 2nd Flash write access[10b]

I2C MENU
1. I2C NVRAM Access[11]
2. I2C Display PWB[12]
3. I2C DTS Chip Comm[59]

S2B MENU
1. S2B Echo[13]
2. S2B Pass-through[14]

DAC I2C MENU
1. I2C Test[66a]
2. I2C Enable Pin On[66b]
3. I2C Enable Pin Off[66c]

DAC CLOCK MENU
1. Clock Internal[67a]
2. Clock External[67b]
3. Clock Frequency SACD[67c]
4. Clock Frequency CDDA[67d]

DAC STREAMSEL MENU
1. DSD Stream Select[68a]
2. PCM Stream Select[68b]

DAC BASE MENU
1. Base Normal[69a]
2. Base Management[69b]

DAC CLOCK MENU
1. DAC CDDA Mode[71a]
2. DAC DVD48 Mode[71b]
3. DAC DVD96 Mode[71c]
4. DAC DSD Mode[71d]

NVRAM MENU
1. NVRAM Config[34]
2. NVRAM reset[35]
3. NVRAM Mod[36]
4. NVRAM write/read[15]

2B UTILS MENU
1. I2C Scart Check[54]
2. Scart to DVD[55a]
3. Scart Pass through[55b]
4. VideoColSetupI2C[52]
5. VideoColSetupHi[53a]
6. VideoColSetupLo[53b]

STATISTICS INFO MENU
1. Total Nr of times Tray Open[47a]
2. Total Time Power On[47b]
3. Total Play-time CDDA & VCD[47c]
4. Total Play-time DVD[47d]

VIDEO COLOURBAR MENU
1. Colourbar DENC On (PAL)[23a]
2. Colourbar DENC Off[23b]
3. Colourbar DENC on (NTSC)[23c]
4. ProgressiveScan MPEG On[24a]

SCART MENU
1. Scart Low (0V to 2V)[25a]
2. Scart Medium (4.5V to 7V)[25b]
3. Scart High (9.5V to 12V)[25c]

5.8 Nuclei Error Codes

In the following tables the error description of the error codes will be described.

5.8.1 Audio Nuclei

Error code	Error text
1880	Test successful
1800	Test successful
1900	Test successful
1920	Test successful
2000	Test successful
2020	Test successful
2100	Test successful
2120	Test successful

5.8.2 Basic Engine Nuclei

Error code	Error text
3900	Test successful
3901	“Parity error from Basic Engine to Serial”
3902	"Unexpected response from Basic Engine"
3903	“Communication time-out error”
3904	“Basic Engine returned error number 0xXX”
3921	“Parity error from Basic Engine to Serial”
3922	“Unexpected response from Basic Engine”
3923	“Communication time-out error”
3924	“Basic Engine returned error number 0xXX”
3800	Test successful
3801	“Parity error from Basic Engine to Serial”
3802	“Unexpected response from Basic Engine”
3803	“Communication time-out error”
3804	“Basic Engine returned error number 0xXX”
3805	“Focus loop could not be closed”
3820	Test successful
3821	“Parity error from Basic Engine to Serial”
3822	“Unexpected response from Basic Engine”
3823	“Communication time-out error”
3824	“Basic Engine returned error number 0xXX”
4200	Test successful
4201	“Parity error from Basic Engine to Serial”
4202	“Unexpected response from Basic Engine”
4203	“Communication time-out error”
4204	“Basic Engine returned error number 0xXX”
4205	“Sledge could not be moved to home position”
4206	“Focus loop could not be closed”
4207	“Motor not on speed within time-out”
4208	“Radial loop could not be closed”
4209	“PLL could not lock in accessing or tracking state”
4210	“Subcode or sector information could not be read”
4211	“Requested subcode item could not be found”
4212	“TOC could not be read in time”
4213	“Seek could not be performed”
4220	Test successful
4221	“Parity error from Basic Engine to Serial”
4222	“Unexpected response from Basic Engine”
4223	“Communication time-out error”
4224	“Basic Engine returned error number 0xXX”
4225	“Sledge could not be moved to home position”
4226	“Focus loop could not be closed”
4227	“Motor not on speed within time-out”
4228	“Radial loop could not be closed”
4229	“PLL could not lock in accessing or tracking state”
4230	“Subcode or sector information could not be read”
4231	“Requested subcode item could not be found”
4232	“TOC could not be read in time”
4233	“Seek could not be performed”
4240	Test successful
4241	“Parity error from Basic Engine to Serial”

Error code	Error text
4242	“Unexpected response from Basic Engine”
4243	“Communication time-out error”
4244	“Basic Engine returned error number 0xXX”
4245	“Sledge could not be moved to home position”
4246	“Focus loop could not be closed”
4247	“Motor not on speed within time-out”
4248	“Radial loop could not be closed”
4249	“PLL could not lock in accessing or tracking state”
4250	“Subcode or sector information could not be read”
4251	“Requested subcode item could not be found”
4252	“TOC could not be read in time”
4253	“Seek could not be performed”
4000	Test successful
4001	“Parity error from Basic Engine to Serial”
4002	“Unexpected response from Basic Engine”
4003	“Communication time-out error”
4004	“Basic Engine returned error number 0xXX”
4005	“Radial loop could not be closed”
4020	Test successful
4021	“Parity error from Basic Engine to Serial”
4022	“Unexpected response from Basic Engine”
4023	“Communication time-out error”
4024	“Basic Engine returned error number 0xXX”
4400	Test successful
4401	Test successful
4100	Test successful
4101	“Parity error from Basic Engine to Serial”
4102	“Unexpected response from Basic Engine”
4103	“Communication time-out error”
4104	“Basic Engine returned error number XX”
4120	Test successful
4121	“Parity error from Basic Engine to Serial”
4122	“Unexpected response from Basic Engine”
4123	“Communication time-out error”
4124	“Basic Engine returned error number XX”
4300	Test successful
4301	“Parity error from Basic Engine to Serial”
4302	“Unexpected response from Basic Engine”
4303	“Communication time-out error”
4304	“Basic Engine returned error number 0xXX”
4320	Test successful
4321	“Parity error from Basic Engine to Serial”
4322	“Unexpected response from Basic Engine”
4323	“Communication time-out error”
4324	“Basic Engine returned error number 0xXX”
3700	“Version: X.Y.Z”
3701	“Parity error from Basic Engine to Serial”
3702	“Unexpected response from Basic Engine”
3703	“Communication time-out error”
3704	“Basic Engine returned error number 0xXX”
5800	Test successful
5820	Test successful
5840	Test successful
5860	Test successful
5801	“Unexpected response from Basic Engine”

5.8.3 Display PWB Nuclei

Error code	Error text
3000	Test successful
3001	“Disp not responding”
3002	“Disp key no response”
3003	“One or more patterns not correct”
2700	“Disp SACD2001”
2701	“Disp key no response”
2702	“Disp not responding”
2707	“Stop key not pressed”
2708	“Pause key not pressed”
2709	“Play key not pressed”
2710	“Open/close key not pressed”
2713	“Previous key not pressed”
2714	“Next key not pressed”
2715	“More than one key not pressed”
2716	“ Audio key not pressed”
2900	Test successful
2901	“Slave not responding”
2902	“Slave keyboard not responding”
2903	“Standby led not working”
2800	Test successful
2801	“Slave display controller not responding”
2802	“Slave keyboard not responding”
2803	“No key press received from remote control”
2600	“The ROM version of the slave processor = 0xXX, and the internal ID = 0xYY”
2601	“I2c bus busy”
2602	“I2c bus not working”
6000	P50 test
6001	“No readback on P50”
6002	“Disp not responding ”
6003	“P50 readback error”

5.8.4 Processor & Peripherals Nuclei

Error code	Error text
700	Test successful
720	Test successful
740	Test successful
600	"All checksums are
601	“Following checksu Checksum is 0xY2 a 0xZ2)”
601	“This test is not avail compiled”

Error code	Error text
6200	"Checksums = 0xA1, 0xB1, 0xC1, 0xD1"
6201	"This test is not available when stand-alone compiled"
1000	Test successful
1001	Test successful
1020	Test successful
1021	Test successful
1100	Test successful
1104	"NVRAM reply time-out"
1203	"Slave controller not responding"
1204	"Slave response is not correct"
5900	Test successful
5901	"I2c bus busy"
5902	"I2c bus not working"
5904	"DTS chip response not correct"
1300	Test successful
1301	"Parity error from basic engine to serial"
1302	"Parity error from serial to basic engine"
1303	"No communication between serial and basic engine"
1304	"Communication time-out error"
1600	Test successful
1601	"The DVD SDRAM is faulty"

5.8.5 Furore Nuclei

Error code	Error text
6300	Test successful
6301	"Memory databus test goes wrong."
6302	"Memory addressbus test goes wrong."
6303	"Physical memory device test goes wrong."
6320	Test successful
6321	"Memory databus test goes wrong."
6322	"Memory addressbus test goes wrong."
6323	"Physical memory device test goes wrong."
6400	Test successful
6401	"Memory databus test goes wrong."
6402	"Memory addressbus test goes wrong."
6320	Test successful
6321	"Memory databus test goes wrong."
6322	"Memory addressbus test goes wrong."
6500	"FURORE version number: XX.YY"

5.8.6 DAC Nuclei

Error code	Error text
7000	Test successful
7001	"DAC I2C bus busy"
7002	"DAC I2C expander "
6600	Test successful
6601	"DAC I2C bus busy"
6602	"DAC I2C expander "
6604	"DAC I2C DAC_LR "
6605	"DAC I2C DAC_LSRS "
6606	"DAC I2C DAC_CLFE "
6620	Test successful
6640	Test successful
6700	Test successful
6701	"DAC clock internal I2C bus busy"
6702	"DAC clock internal I2C connection failed"
6720	Test successful
6721	"DAC clock external I2C bus busy"
6722	"DAC clock external I2C connection failed"
6740	Test successful
6741	"DAC clock frequency SACD I2C bus busy"
6742	"DAC clock frequency SACD I2C connection failed"
6760	Test successful
6761	"DAC clock frequency CDDA I2C bus busy"
6762	"DAC clock frequency CDDA I2C connection failed"
6800	Test successful
6801	"DAC DSD Stream Select I2C bus busy"
6802	"DAC DSD Stream Select I2C connection failed"
6820	Test successful
6821	"DAC PCM Stream Select I2C bus busy"
6822	"DAC PCM Stream Select I2C connection failed"
6900	Test successful

Error code	Error text
6901	"DAC Base Normal I2C bus busy"
6902	"DAC Base Normal I2C connection failed"
6920	Test successful
6921	"DAC Base Management Select I2C bus busy"
6922	"DAC Base Management I2C connection failed"
7100	Test successful
7101	"DAC mode CDDA I2C bus busy before start"
7102	"DAC mode CDDA I2C connection failed"
7120	Test successful
7121	"DAC mode DVD48 I2C bus busy before start"
7122	"DAC mode DVD48 I2C connection failed"
7140	Test successful
7141	"DAC mode DVD96 I2C bus busy before start"
7142	"DAC mode DVD96 I2C connection failed"
7160	Test successful
7161	"DAC mode DSD I2C bus busy before start"
7162	"DAC mode DSD I2C connection failed"

5.8.7 Log Nuclei

Error code	Error text
7000	Test successful
7001	"DAC I2C bus busy"
7002	"DAC I2C expander "
6600	Test successful
6601	"DAC I2C bus busy"
6602	"DAC I2C expander "
6604	"DAC I2C DAC_LR "
6605	"DAC I2C DAC_LSRS "
6606	"DAC I2C DAC_CLFE "
6620	Test successful
6640	Test successful
6700	Test successful
6701	"DAC clock internal I2C bus busy"
6702	"DAC clock internal I2C connection failed"
6720	Test successful
6721	"DAC clock external I2C bus busy"
6722	"DAC clock external I2C connection failed"
6740	Test successful
6741	"DAC clock frequency SACD I2C bus busy"
6742	"DAC clock frequency SACD I2C connection failed"
6760	Test successful
6761	"DAC clock frequency CDDA I2C bus busy"
6762	"DAC clock frequency CDDA I2C connection failed"
6800	Test successful
6801	"DAC DSD Stream Select I2C bus busy"
6802	"DAC DSD Stream Select I2C connection failed"
6820	Test successful
6821	"DAC PCM Stream Select I2C bus busy"
6822	"DAC PCM Stream Select I2C connection failed"
6900	Test successful
6901	"DAC Base Normal I2C bus busy"
6902	"DAC Base Normal I2C connection failed"
6920	Test successful
6921	"DAC Base Management Select I2C bus busy"
6922	"DAC Base Management I2C connection failed"
7100	Test successful
7101	"DAC mode CDDA I2C bus busy before start"
7102	"DAC mode CDDA I2C connection failed"
7120	Test successful
7121	"DAC mode DVD48 I2C bus busy before start"
7122	"DAC mode DVD48 I2C connection failed"
7140	Test successful
7141	"DAC mode DVD96 I2C bus busy before start"
7142	"DAC mode DVD96 I2C connection failed"
7160	Test successful
7161	"DAC mode DSD I2C bus busy before start"
7162	"DAC mode DSD I2C connection failed"

5.8.8 Miscellaneous Nuclei

Error code	Error text
3400	Test successful
3401	“The configuration data could not be read from NVRAM”
3402	“I2C bus busy before start”
3500	“NVRAM is cleared”
3501	“The NVRAM could not be reset.”
3502	“I2C bus busy before start”
3600	“NVRAM contents updated.”
	“NVRAM contents and configuration checksum updated.”
3601	“NVRAM contents could not be updated.”
3602	“I2C bus busy before start”
3603	“NVRAM contents could not be read”
3604	“NVRAM not accessible.”
3605	“NVRAM checksum could not be updated.”
1500	Test successful
1502	“NVRAM access time-out”
1504	“NVRAM fails”
5400	Test successful
5401	“I2c bus busy”
5402	“I2c bus not working“
5403	“Scart switch controller not responding”
5404	“Scart switch controller response not correct”
5500	Test successful
5501	“I2c bus busy”
5502	“I2c bus not working“
5520	Test successful
5521	“I2c bus busy”
5522	“I2c bus not working“
5523	“Scart switch controller not responding”
5200	Test successful
5201	“I2c bus busy”
5202	“I2c bus not working“
5300	Test successful
5301	“I2c bus busy”
5302	“I2c bus not working“
5320	Test successful
5321	“I2c bus busy”
5322	“I2c bus not working“
4700	“Number of times Tray went Open : XX”
4701	The total number of times tray went open could not be read from NVRAM.
4702	I2C bus busy before start
4720	“Total Power On time (minutes) : XX”
4721	The total power-on time could not be read from NVRAM.
4722	I2C bus busy before start
4740	“Total CDDA & VCD disks Play-time (minutes) : XX”
4741	The playtime of CDDA & VCD disks could not be read from NVRAM.
4742	I2C bus busy before start
4760	“Total DVD disks Play-time (minutes) : XX”
4761	The playtime of DVD disks could not be read from NVRAM.
4762	I2C bus busy before start
4600	“Version of Application Software : XX”
4601	“The application version could not be read from NVRAM.”
4602	“I2C bus busy before start”

5.8.9 Video Nuclei

Error code	Error text
2300	Test successful
2320	Test successful
2340	Test successful
2460	Test successful
2421	“I2c bus busy”
2481	“I2c bus busy”
2401	“I2c bus busy”
2500	Test successful
2501	“I2c bus busy”
2502	“I2c bus not working“
2520	Test successful
2521	“I2c bus busy”
2522	“I2c bus not working“
2540	Test successful
2541	“I2c bus busy”
2542	“I2c bus not working“

5.9 Test instructions SACD Mono Board

5.9.1 General

- Impedance of measuring-equipment should be > 1M(.
- Most tests have to be done by software commands. Together with the software command you will find a Ref.# nbr. This is the number of the diagnostic nucleus used for this test. More detailed information can be found in the description of the command mode interface.
- Levels: Most measurements are digital measurements. The high and low levels in this document got to have next specification:

low	: < 0.3V (LVTTL)
high	: > 3.0V (LVTTL)
LOW	: < 0.4V (TTL)
HIGH	: > 4.5V (TTL)

- All the supply signal_name with "STBY" are present during standby
- Because all clocks are derived from the SACD clock (384FS_in) from the AV board, this board should always be connected to the mono board.
- The switching mode power supply (SMPS) output is switched on/off by the STB_OUT signal from the mono board to the AV board.

5.9.2 General Start-up Measurements

Supply Check:
Measure the voltages on the pins of the connector 1600 with a multimeter.

pin	TP	Signal_name	Voltage
1600-1	F604	+3V3	+3V3
1600-2	F604	+3V3	+3V3
1600-3	F631	+5V	+5V (0V during standby)
1600-4	F614	+5Vstby	+5V
1600-5	F615	+6Vstby	+6V
1600-6	F623	GND	+5V (0V during standby)
1600-7	F623	GND	0V
1600-8	F623	GND	0V
1600-9	F618	-8Vstby	-5V
1600-10	F634	STB_CONT	0V (+5V during standby)
1600-11	F636	+12Vstby	+12V
1600-12	F623	GND	0V
1600-13	F675	PWR_FAIL	+2.1V (1.4V during standby)

Also check the following power supplies:
Testpoint F608: +3V3 (5%. (Check IC7605 in case of failure)
Testpoint F632: +3V3 (5%. (Check IC7622 in case of failure)
Testpoint F101: +9V (5%. (Check IC7109 in case of failure)

Check the supply currents to be sure that there are no major failures on the board.
Measure the currents flowing toward the mono board using a Tektronix AM503B current probe on the wires between the switch mode power supply and the connector 1600.

pin	TP	Signal_name	measured
1600-1	F605	+3V3	560 mA
1600-2	F605	+3V3	
1600-3	F631	+5V	510 mA
1600-4	F614	+5Vstby	2 mA
1600-5	F615	+6Vstby	< 1 mA
1600-6	F623	GND	
1600-7	F623	GND	
1600-8	F623	GND	
1600-9	F618	-8Vstby	54 mA
1600-10	F634	STB_CONT	
1600-11	F636	+12Vstby	90 mA
1600-12	F623	GND	
1600-13	F675	PWR_FAIL	

5.9.3 Reset Circuitry

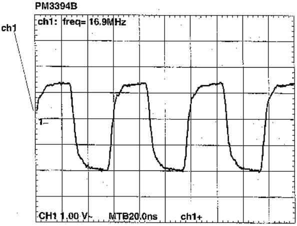
Reset of Sti5505:
In power down mode STB_CONT is high; the clock is disabled in order to reduce the power consumption. When STB_CONT goes low, STB_CONTD goes high and enables the 27 MHz clock.
Check that this clock is present and stable before the RESETn is de-asserted. RESETn is a signal, which allows initialising the main processor. We check also that when going from ON mode to stand-by mode, the 27 MHz is held for a certain moment after RESETn is asserted.

Reset of Servo:
The reset for the Servo circuit is given on Power On to the MACE IC 7207 with POR via C2215, R3234 and D6200. The reset signals STB_DALAS for DALAS and PORN for HD61are generated by MACE IC.
When POR is not working (due to a hang-up situation), an extra reset signal RSTN, coming from the Sti5505 will wake up the Servo circuit.

5.9.4 Clock Check

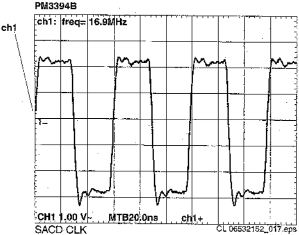
The source clock comes from the AV board. The SACD CLK is a master clock from which all the other clocks are derived. If this one is not present the system cannot start and work.
The SACD power supply, the mono board and the AV board should be connected together. On power up the clocks appear on the board. All clocks to be measured have a 0.02% tolerance.

Clockname	Test point	Frequency / level
384Fs_in	F911	16.9344 MHz / 3V3
SACD_CLK	F903	16.9344 MHz / 5V
27M_CLK	F503	27MHz / 5V
PCMCLK_AV	F640	12.288MHz / 3V3
MACE CLOCK	F211	8.46 MHz / 3V3



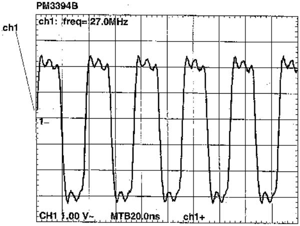
384FS_IN

CL 06532152_016.eps
051200



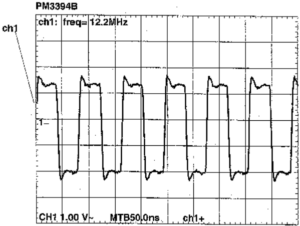
SACD CLK

CL 06532152_017.eps
051200



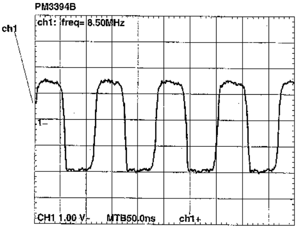
27M_CLK

CL 06532152_018.eps
051200



PCM CLK_AV

CL 06532152_019.eps
051200



MACE CLK

CL 06532152_020.eps
051200

5.9.5 Tests with Diagnostic Software Program

The SACD diagnostic program is included in the SACD application software. This program permits to test a lot of functions of the PCB. We group in this part the memory tests, the general serial bus tests and the peripheral tests of the mono board.

Start Up

Conditions
The units required are the switch mode power supply, the mono board and the AV board. This is the minimum set up for the diagnostic program, when testing memories and peripherals. When using the Compair serial cable, pin 1602-2 is directly connected to GND and after powering on, the diagnostic program will be started.
The other end of the service cable is connected to a PC serial port. On the PC you need to open an HyperTerminal and configure it as follows: 19200 b/s, 8 bits data, no parity, 1 stop bit, no control flow.

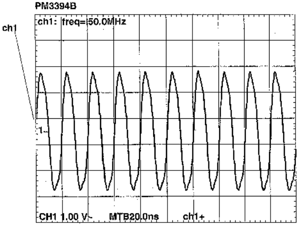
Start the Diagnostic
When you switch on, the diagnostic checks the serial port in both directions, followed by few other commands. Those are done automatically during power up. The following message is displayed on the HyperTerminal: **"DVDv2 Diagnostic Software version ..."**. Then the program is waiting that you select a mode. Getting this screen means the Sti5505 can boot from flash. The program is running and the service interface is functioning. Enter the mode you wish to use. You can use either the Menu mode or the Command mode. In the first mode, the main menu appears, you can navigate into the menu system and you can select the individual command, just type the corresponding number to launch it. In the second mode, just type the Ref.# number to do the test. When a Ref.# command is available in the diagnostic program, it will be explained as follow :

Ref.#	Command Name	Remark

At the end of the test, the diagnostic program will return "OK" if the test is passed. Otherwise an error message will appear.

System Clock
ST_CLK is the system clock and is derived from the 27 MHz by the internal PLL of the Sti5505 (pin137).

Name	Test point	Frequency	Level
ST_CLK	F822	49.95 MHz	TTL



ST_CLK

CL 06532152_021.eps
051200

Memories

Flashes

Read flash test:

If you can start the diagnostic that means you are able to read the flashes and the program is running. Then you can normally use the diagnostic program. At this moment you can launch the checksum calculation from the diagnostic program.

Ref.#	Command Name	Remark
6	Checksum FLASH	

If you don't encounter any problem during utilisation of the diagnostic program means the Sti5505 is properly connected to the flashes.

SDRAM

Use the diagnostic program for a complete software test of the SDRAM.

Ref.#	Command Name	Remark
16	SDRAM Write Read	Extensive test

I2C Bus Test

EEprom

To access the EEPROM, the I2C bus is used. So writing and reading back to the EEPROM check the chip and the bus.

Ref.#	Command Name	Remark
11	NVRAM I2C	Quick test - Write and read back

The complete EEPROM can also be checked but it takes a lot of time to write and read back at all the locations.

Ref.#	Command Name	Remark
15	NVRAM write read	Extensive test - Write and read-back

Display Board

The mono board accesses to the display board through the I2C bus. You can test this serial bus up to the connector 1501. So connect the display board to the mono board and launch either the following command :

Ref.#	Command Name	Remark
12	I2C Display PWB	Write and read back
26	version	Software version of the slave processor rom

S2B Bus

The S2B is the interface between the digital part and the front end. This bus links the STi5505 and the MACE2. The S2B echo command permits to check the communication between those devices.

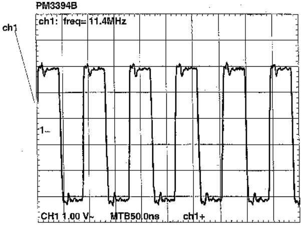
Ref.#	Command Name	Remark
13	S2b Echo	Write and read back

Peripherals

Audio Clock Select

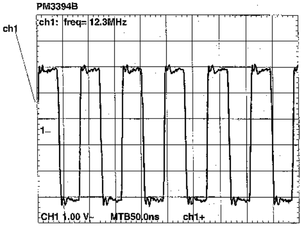
This clock is derived from the SACD CLOCK by the mono board system clocks. The audio PCM_CLK can take 3 values. The Sti5505 PIO's permit to select 3 different frequencies depending on the application. Check those frequencies on F566

Ref.#	Command Name	Frequency	SEL_ACLK2	SEL_ACLK1
7a	Clock 11.289 MHz	11.2896 MHz	0	1
7b	Clock 12.288 MHz	12.288 MHz	1	0
7c	Clock 24.576 MHz	24.576 MHz	1	1



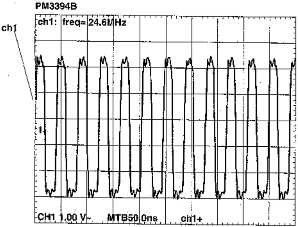
PCM clk 11,298MHz

CL 06532152_022.eps
051200



PCM clk 12.288MHz

CL 06532152_023.eps
051200



PCM clk 24.576MHz

CL 06532152_024.eps
051200

Audio Mute

Ref.#	Command Name	MUTE_AV at F625	Remark
19a	Mute ON	+4.8V	Audio Mute On
19b	Mute OFF	-8V	Audio Mute Off

Center On/Mono

Check whether we can switch between the mono mode and the stereo mode. Measure the level on F633.

Ref.#	Command Name	Center on	Remark
56c	Centre-On-Stereo Pin On	3.3V	Mono
56d	Centre-On-Stereo Pin Off	0V	Stereo

I2C DAC

Check whether you can enable or disable the I2C switch. When driving the I2C_DAC signal measure the corresponding level at F001.

Ref.#	Command Name	level
66b	I2C enable	H = 5V
66c	I2C disable	L = 0V

Slow Blanking

An additional part of the video-path is the scart-switching or slow blanking voltage.

This voltage can be 0V, 6V, 12V. Check at F620 the output voltage with next commands:

Ref.#	Command Name	Remark	Level
25a	Scart Low	No picture	0V 0.5V
25b	Scart Medium	16/9 format	6V 10%
25c	Scart High	4/3 format	12V 10%

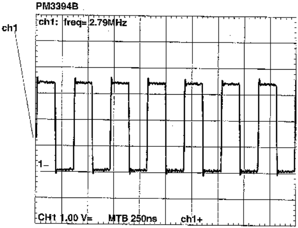
PCM Audio on I2S Bus

For this test connect the A/V board and the front panel to the monoboard. Don't forget to power up the front panel. The I2S audio signals are measured in 3 different situations: no audio, sine wave is played, pink noise is played.

No Audio

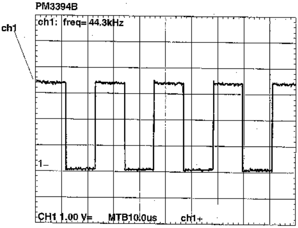
Switch ON the power supplies and check these signals

Signal	Test point	type	Level	Frequency
SCLK_AV	F637	Clock	LVTTL	2.82MHz < 0.02%
LRCLK_AV	F641	Clock	LVTTL	44.1KHz < 0.02%
PCM_CLK_AV	F640	No signal	LVTTL	N/A
PCMOUT_AV	F638	No signal	LVTTL	N/A
PCM_Ce_Lf_Fur	F659	No signal	LVTTL	N/A
PCM_LsRs_Fur	F504	No signal	LVTTL	N/A
SPDIF	F644	Data stream	TTL	N/A



SCLK_AV

CL 06532152_025.eps
051200



LRCLK_AV

CL 06532152_026.eps
051200

Sine Wave

Generate the sine wave with the following command

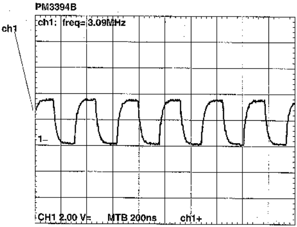
Ref.#	Command Name	Remark
21a	Sine ON	Play the sine wave at the audio outputs.

Then measure the following signals

Signal	Test point	type	Level	Frequency
SCLK_AV	F637	Clock	LVTTL	3.072MHz < 0.02%
LRCLK_AV	F641	Clock	LVTTL	48 kHz < 0.02%
PCMCLK_AV	F640	Clock	LVTTL	12.288 MHz < 0.02%
PCMOUT_AV	F638	Data stream	LVTTL	N/A
PCM_Ce_Lf_Fur	F659	No signal	LVTTL	N/A

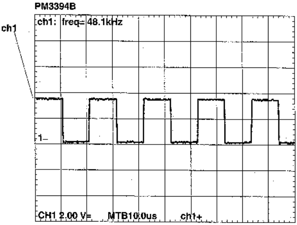
Signal	Test point	type	Level	Frequency
PCM_LsRs_Fur	F504	No signal	LVTTL	N/A
SPDIF	F644	Data stream	TTL	N/A

Press "STOP" to switch off the sine wave.



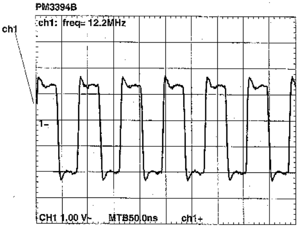
SCLK_AV 3.072MHz

CL 06532152_027.eps
051200



LRCLK_AV 48kHz

CL 06532152_028.eps
051200



PCM CLK_AV

CL 06532152_029.eps
051200

Pink noise
Generate the pink noise with the following command

Ref.#	Command Name	Remark
20a	Pink Noise ON	Play the pink noise at the audio outputs

Then measure the following signals

Signal	Test point	type	Level	Frequency
SCLK_AV	F637	Clock	LVTTL	3.072MHz < 0.02%
LRCLK_AV	F641	Clock	LVTTL	48 kHz < 0.02%
PCM_CLK_AV	F640	Clock	LVTTL	12.288 MHz < 0.02%
PCMOUT_AV	F638	Data stream	LVTTL	N/A
PCM_Ce_Lf_Fur	F659	Data stream	LVTTL	N/A
PCM_LsRs_Fur	F504	Data stream	LVTTL	N/A
SPDIF	F644	Data stream	TTL	N/A

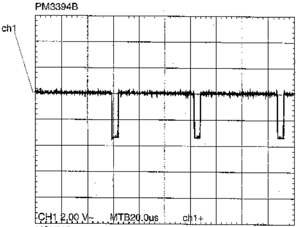
5.9.6 Video

From the diagnostic program, play the 8 colour bar pattern.

Ref.#	Command Name	Remark
23a	Colour bar On	8-color bar pattern
23b	Colour bar Off	Disable the pattern

Video Hsync
Measure this output at F656

Ref.#	Command Name	Remark	Value
23a	Colour bar On		15.625 kHz 0.02% Vpeak-peak > 3V

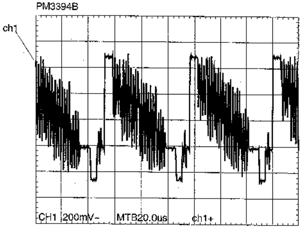


HSYNC

CL 06532152_030.eps
051200

Video signals

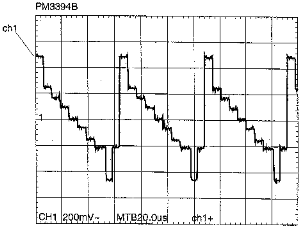
CVBS
Measured at F657



CVBS

CL 06532152_031.eps
051200

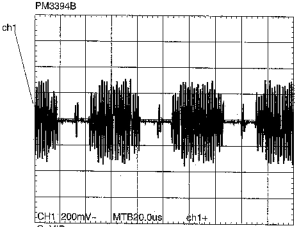
Luminance Y-VID
Measured at F662



Y_VID

CL 06532152_032.eps
051200

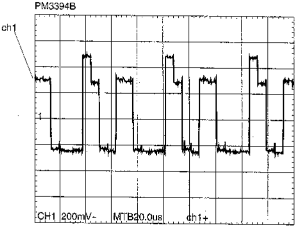
Chrominance C_VID
Measured at F665



C_VID

CL 06532152_033.eps
051200

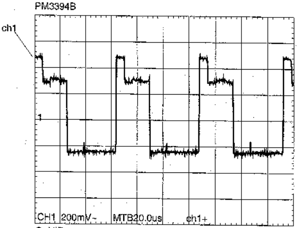
Red R_VID
Measured at F646



R_VID

CL 06532152_034.eps
051200

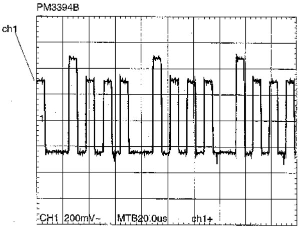
Green G_VID
Measured at F649



G_VID

CL 06532152_035.eps
051200

Blue B_VID
Measured at F653



B_VID

CL 06532152_036.eps
051200

Switch off the colour bar with the following command:

Ref.#	Command Name	Remark	Value
23b	Colour bar Off		Disable the pattern

SACD Processor/Furore

With the following commands, the access of the Furore and its SDRAM is checked.

Ref.#	Command Name	Remark
65	DS_FURORE_Id	Check Furore ID
63a	DS_FURORE_Sdram WrRLow	Check full speed SDRAM
63b	DS_FURORE_Sdram WrRHigh	Check full speed SDRAM
64a	DS_FURORE_Sdram WrRLowFast	Check full speed SDRAM
64b	DS_FURORE_Sdram WrRHighFast	Check full speed SDRAM

RF Signal Amplitude

This signal is measured at F851 just at the input of the Furore. When no disc is in the player, we measured 54 mV. Then a disc is inserted and played, at this moment the RF signal increases. We measured 1.05 V amplitude and the level of this input should be between 0.2V and 1.5 V. Then we can play normally a SACD disc.

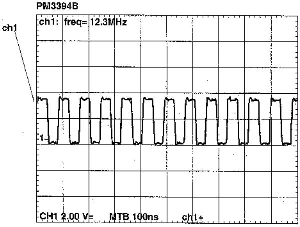
DSD Outputs

With the diagnostic software, we can partially test the DSD_PCM bus toward the AV board. When you play a pink noise, digital bit stream is coming out of the Furore and is fed to the AV board.

Ref.#	Command Name	Remark
20a	Pink Noise ON	Play the pink noise at the audio outputs

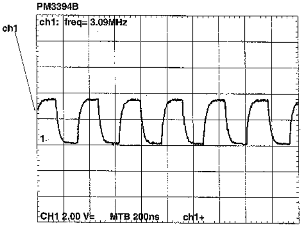
Measure the following signals

Signal	Test point	type	Level	Frequency
DSD_PCM(8)	F002	Clock	LVTTL	12.288 MHz < 0.02%
DSD_PCM(6)	F003	Clock	LVTTL	3.072 MHz < 0.02%
DSD_PCM(7)	F004	Clock	LVTTL	48 kHz < 0.02%
DSD_PCM(0)	F005	Data stream	LVTTL	N/A
DSD_PCM(1)	F006	Signal : High	LVTTL	N/A
DSD_PCM(4)	F007	Data stream	LVTTL	N/A
DSD_PCM(5)	F008	Signal : High	LVTTL	N/A
DSD_PCM(2)	F009	Data stream	LVTTL	N/A
DSD_PCM(3)	F010	Signal : High	LVTTL	N/A



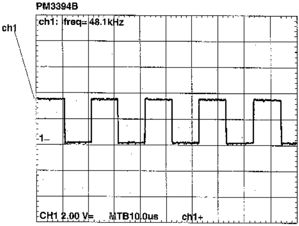
DSD_PCM8

CL 06532152_037.eps
051200



DSD_PCM6

CL 06532152_038.eps
051200



DSD_PCM7

CL 06532152_039.eps
051200

5.9.7 Servo Tests

General Start-up Measurements:

Reset the Basic Engine part

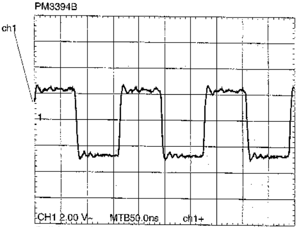
Ref. #	Command Name	Remark
44	BeReset	Reset Basic Engine

Check Vref

Name	Testpoint	Value
Vref	F188	2.5V+/-0.3

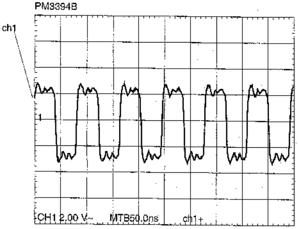
Check I2S interface

Name	Testpoint	Value
B_BCLK	F347	6.0MHz +/-0.1
CL1	F337	12.0MHz +/-0.2
B_WCLK	F343	HIGH
Stopclk	F338	HIGH
B_Sync	F344	HIGH
B_V4	F348	HIGH



B_BCLK

CL 06532152_040.eps
051200



CL1

CL 06532152_041.eps
051200

Disc Motor:

Before switching on the disc motor, check the following test points:

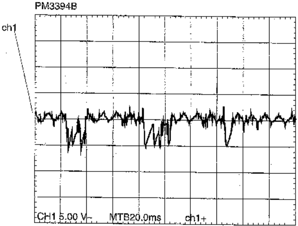
Name	Testpoint	Value
Stby	F357	high
Stby-out	F355	LOW
Moto1	F361	3V0.3

Switch the Discmotor on/off with next commands:

Ref. #	Command Name	Remark
39a	BeDiscmotorOn	Discmotor on
39b	BeDiscmotorOff	Discmotor off

Check the following signals when discmotor has been switched on:

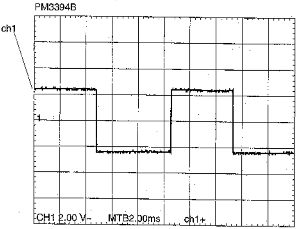
Name	Pin nr.	Frequency
Stby	F357	low
Stby-out	F355	HIGH
Moto1	F361	2V0.5V
A3	F350	see oscillogram
A2	F352	see oscillogram
A1	F353	see oscillogram



A1-A2-A3

CL 06532152_042.eps
051200

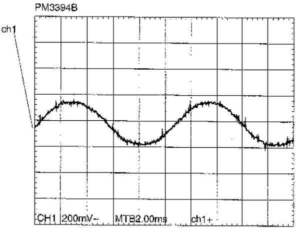
T1	F280	see oscillogram
T2	No testpoint present	see oscillogram
T3	F371	see oscillogram



T1-T2-T3

CL 06532152_043.eps
051200

VH	F365	3V0.5V
H1+	F354	see oscillogram
H1-	F359	see oscillogram
H2+	F364	see oscillogram
H2-	F366	see oscillogram
H3+	F367	see oscillogram
H3-	F370	see oscillogram



H1-H2-H3

CL 06532152_044.eps
051200

Switch the discmotor off.

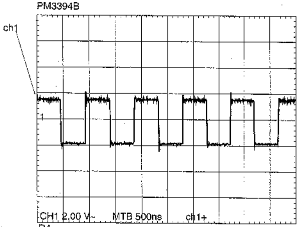
Radial

Swith the radial control on/off with the following commands:

Ref. #	Command Name	Remark
40a	BeRadialOn	Radial control on
40b	BeRadialOff	Radial control off

Check the following signals:
Check for pulse density signal RA at testpoint F227

Name	Testpoint	Value
Rad -	F128	4.3V0.5V
Rad +	F121	4.3V0.5V



RA

CL 06532152_045.eps
051200

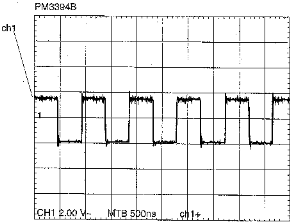
Check if laser is switched on (visual check of laserlight).
Switch the radial control off.

Sledge

Use the following commands to move the sledge:

Ref. #	Command Name	Remark
41a	BeSledgeIn	Sledge inwards
41b	BeSledgeOut	Sledge outwards

Check pulse density signal SL at testpoint F221



SL

CL 06532152_046.eps
051200

Name	Testpoint	Value
Sl -	F039	4.5V0.5V
Sl +	F038	4.5V0.5V

Measure peak to peak signal on SL- and SL+ while moving sledge outwards.

Name	Testpoint	Value
Sl -	F039	10Vptp +/-0.5
Sl +	F038	10Vptp +/-0.5

Measure input sledge control (sledge in home position)

Name	Testpoint	Value
Sinph	F182	1.5V0.5V
Cosph	F192	1.5V0.5V

Tray:

To open and close the tray use the following commands:

Ref. #	Command Name	Remark
43a	BeTrayIn	Tray in
43b	BeTrayOut	Tray out

Measure the driver outputs of the BA5938FM for the tray closed.

Name	Testpoint	Value
Vo2 -	F116	4.3V2.0V
Vo2 +	F111	4.3V2.0V

Measure again the driver outputs while the tray is opening.

Name	Testpoint	Value
Vo2 -	F116	6.0V1.0V
Vo2 +	F111	2.0V1.0V

Measure again the driver outputs while the tray is closing

Name	Testpoint	Value
Vo2 -	F116	2.0V1.0V
Vo2 +	F111	6.0V1.0V

Focus

To switch the Focus motor on/off, use the following commands:

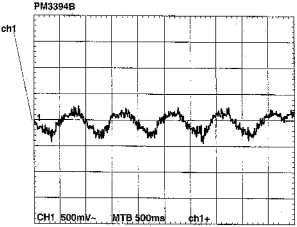
Ref. #	Command Name	Remark
38a	BeFocusOn	Focus on
38b	BefocusOff	Focus off

Measure the driver outputs of the BA5938FM for the Focus off.

Name	Testpoint	Value
foc -	F124	4.3V0.5V
foc +	F127	4.3V0.5V

Switch the focus on
Measure again the driver outputs

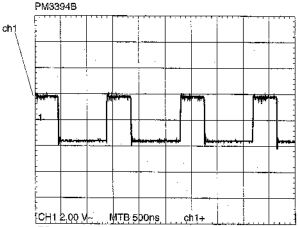
Name	Testpoint	Value
Foc - (sawtooth)	F124	1V0.2V
Foc + (sawtooth)	F127	1V0.2V



FOC +

CL 06532152_047.eps
051200

Check for pulse density signal FO at testpoint F234



FO

CL 06532152_048.eps
051200

Check for laserlight.
Switch the focus off

Hf Path

Play DVD test disc.
Measure outputs of diodes A, B, C, D, E, F.

Name	Testpoint	Value
A	F140	2.6V0.2V
B	F141	2.6V0.2V
C	F143	2.6V0.2V
D	F144	2.6V0.2V
E	F147	2.6V0.2V
F	F148	2.6V0.2V

Measure DVDALAS outputs

Name	Testpoint	Value
RFO DC	F146	2.5V 0.2V, eyepattern 1Vptp
O1	F155	25mV10mV
O2	F158	25mV10mV
O3	F168	25mV10mV
O4	F165	25mV10mV
S1	F174	25mV10mV
S2	F175	25mV10Mv

5.10 Test Instructions Display Board

5.10.1 Display board

Introduction

These test instructions are written for Display PCBAS 3139 248 81401.

The contents of the Display Board can be split up into next blocks:

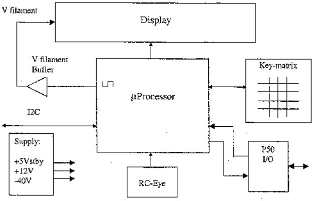


Figure 5-39

Functionality Description:

The essential component of the display PCB is the uP (slave). This slave works on an 8MHz resonator and has a reset circuit that is triggered by the +5Vstby. After the reset pulse, the standby control line will release the reset of the host uP. This host uP will then initialise the slave. In addition, when going to stand-by, the slave will put the host uP in reset. When the slave receives the right IR or key code to leave the standby mode, the reset of the host uP will be released.

Other slave functions are:

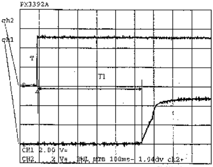
- Square signal generator to generate the filament voltage, which is required for an AC FTD.
- Generates the grid and segment scanning for the FTD.
- Generates a scanning grid for the keys (separated from display scanning).
- Has inputs for RC (RC5 and RC6) and P50 (P50 controller is built in).

General

- Oscilloscope measurements have been carried out using a Philips PM3392A.
- Impedance of measuring-equipment should be > 1MΩ.
- To do correct measurements we recommend to use supply 3139 248 70851. Make sure that the main 3.3V has a 0.7A load.

Reset

Check next reset timing with an oscilloscope at pin 10 of the μιχpoprocessor 7401.



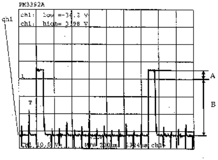
CL 96532065_073.eps
150799

Figure 5-40

Timing: 400msec < T1 > 700msec.
CH1: +5Vstby voltage at power on.
CH2: Voltage at pin 10.

Display Steering

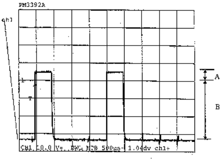
Check next timing and level for all grid-lines (G1 r G14).



CL 96532065_074.eps
130799

Figure 5-41

1. Check level A: +4V5 ±10% for grid lines 1 => 11
2. Check level A: +4V0 ±10% for grid lines 12 => 14
3. Check level B: -33V ±10%
4. Check timing and levels of segment-lines P1 r P10:



CL 96532065_076.eps
130799

Figure 5-42

Level A:+4V5 ±10%
Level B:-33V ±10%

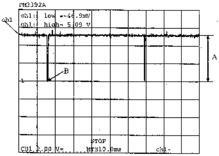
The data on these segment lines depend on the characters that are displayed.

The characters can be set by sending I2C commands to the display.

See the Slave URS how to send a display command.

Key-Matrix

Connect a extra 10k(pull-up to pin 36 en 37 of the uP and check next matrix scanning at these pins.



CL 98532065_078.eps
150799

Figure 5-43

Level A: 5.0V ±7%
Level B: 0V ±200mV
Check matrix scanning from pin 26 until 33 of the uP.
The results should be the same as the diagram above.

I.R. Receiver

Check at pin 22 of 7401 if this line switches from low (< 0.3V) to high (> 4.5V), while pressing a key on a Philips RC5 or RC6 remote control.

P50 Interface

P50 is a bi-directional serial interface, which is used for communication between video equipment. For European sets, this communication goes via pin 10 of the scart-bus. In other regions, it can be a cinch bus at the back of the set.

1. Keep the uP in reset by short-circuiting emitter and collector of transistor 7105, via resistor 3100 and 3107 transistor 7101 is switched on.
2. Check the voltage at the P50 output connector 1108-5: < 200mV.

When the reset is released the uP output-pin becomes low and transistor 7101 is switched off.

1. Check the voltage at the P50 output connector 1108-5: 4V9 ±5%.
2. Check also the uP P50 input (uP pin 20): 5V ±5%.
3. Connect the P50 line (connector 1108-5) to ground.
4. Check again the uP P50 input (uP pin 20): <0V3.

5.11 Test Instruction Audio/Video Board

These test instructions can be used for all versions of the A/V board which has the following outputs:

- Audio L/R
- 5.1 Audio output
- Subwoofer output
- Optical / Coaxial digital output
- CVBS
- Y/G_vid,U/B_vid,V/R_vid output
- S-video
- Scart output

5.11.1 General

- All the waveforms measurement carried out in these test instruction will be base on the testpoint indicated in the A/V board schematic diagram in the Service manual.
- Impedance of the measuring-equipment should be > 1MΩ
- Most of the tests can be done using either the Diagnostic software " Player script" which can be found in the chapter "Diagnostic Software description and troubleshooting" or the Menu interface using the Service PC with a terminal emulation program (e.g. Window Hyperterminal) where it is possible to control the execution of the Diagnostic Nuclei
- Setup for the measurement will be done in set level with all modules connected as shown in the Wiring Block diagram.

5.11.2 General Start-Up Measurement

Supply Check:

Before starting the measurement,ensure that all power supply are connected to the A/V board.

Pin nbr	Supply
1405-9	-5V (-Vcc)
1405-10	+5V
1405-11	+5V

The supply currents can be measured using a Tektronics AM503B current probe or equivalent.

Supply	Power consumption (AVG)
+5VA	+5V ± 3% I = 200mA
+5Vvid	+5V ± 3% I = 200mA
-5V	-5V ± 3% I = 200mA

Clock Check

Ensure the present of the clock to the DAC

Clock Name	Testpoint	Frequency
PCM_CLK	I165	11.2896MHz ± 0.02% tolerance
384FS	I110	16.9344MHz ± 0.02% tolerance

Audio Mute Check

Measure the Audio mute voltage input at pin 12 of connector 1405

Status	Value
AudioMuteOn	4.7V ± 10%
AudioMuteOff	-8V ± 10%

To toggle between ON and OFF,use the following commands:

Ref.#	Command Name	Remarks
19a	AudioMuteOn	Audio Mute On
19b	AudioMuteOff	Audio Mute Off

5.11.3 Audio DAC And Amplifier

Ensure that the Audio mute signal is OFF
To check the DAC and buffer amplifier,send the following commands:

Ref.#	Command Name	Remarks	Audio output
21a	AudioSineOn	Audio Sine signal ON	Sine,1Khz on stereo
----	Press stop button	Audio Sine signal OFF	No waveform
20a	AudioPinkNoiseOn	Audio Pinknoise ON	Pink Noise on 6 channels
20b	AudioPinkNoiseOff	Audio Pinknoise OFF	No waveform

The audio signal (sine or pink noise) will also be present on the digital output (SPDIF).This can be checked by connecting digital signal to an amplifier with digital input.
Check the I2S and audio signal at the following testpoints:

Name	Testpoint
LRCLK	I117
BCLK	I118
PCM_CLK	I165
SDT3	I112
SDT2	I114
SDT1	I116
DIG_OUT	I583
AUDIO L/R OUT	I321 / I322
FRONT L/R OUT	I326 / I328
SURROUND L/R OUT	I333 / I337
CENTRE OUT	I410
SUB WOOFER L/R OUT	I407

All waveforms can be refered to the A/V schematic diagram.

5.11.4 Video Output And Buffer Amplifier

Check DC output-level at all video cinch output : 1.0V DC ± 10%
Generate a color bar using the following software commands:

Ref.#	Command Name	Remarks
23a	VideoColDencOn	Colour DENC ON
23b	VideoColDencOff	Colourbar DENC OFF

Check the video outputs at the following testpoints:

Name	Testpoint
B_VID	I500 / I553
G_VID	I502 / I554
R_VID	I503 / I555
CVBS out	I562 / I560
S-Video-C out	I566
S-Video-Y out	I565
Y out	I572
U out	I576
V out	I582

ll waveforms can be refered to the A/V schematic diagram.

5.11.5 Play and 16/9 Detection

Check DC voltage at S-Video-chroma output (pin 4) with a 6K8 ohm load and Scart connector (pin 8) and change the 0/6/12 input (1405-8) using the following commands:

Ref.#	Command Name	Remarks	Chroma output
25a	VideoScartLo	Sends out 0V 0.5V	<0.1V
25b	VideoScartMi	Sends out 6V 10%	2.0V 10% with load
			5.0V 10% without load
25c	VideoScartHi	Sends out 12V 10%	<0.1V

5.11.6 Kill Circuit

To check the functionality of the Kill circuitry,the audio outputs has to be present by the following command:

Ref.#	Command Name	Remarks	Audio output
21a	AudioPinkNoiseOn	Audio Pinknoise ON	Pink Noise on 6 channels

Check the audio outputs at the audio cinch of the A/V board : Pink Noise
Activate the Kill circuit by using the following command:

Ref.#	Command Name	Remarks
19a	AudioMuteOn	Audio Mute On

Check the audio outputs at the audio cinch of the A/V board : No waveform
Switch off the kill circuit by using the following command:

Ref.#	Command Name	Remarks
19b	AudioMuteOff	Audio Mute Off

Check the audio outputs at the audio cinch of the A/V board : Pink Noise

5.11.7 Base Management

To check the Base management, the audio signal has to be present with the command: AudioPinknoise ON.

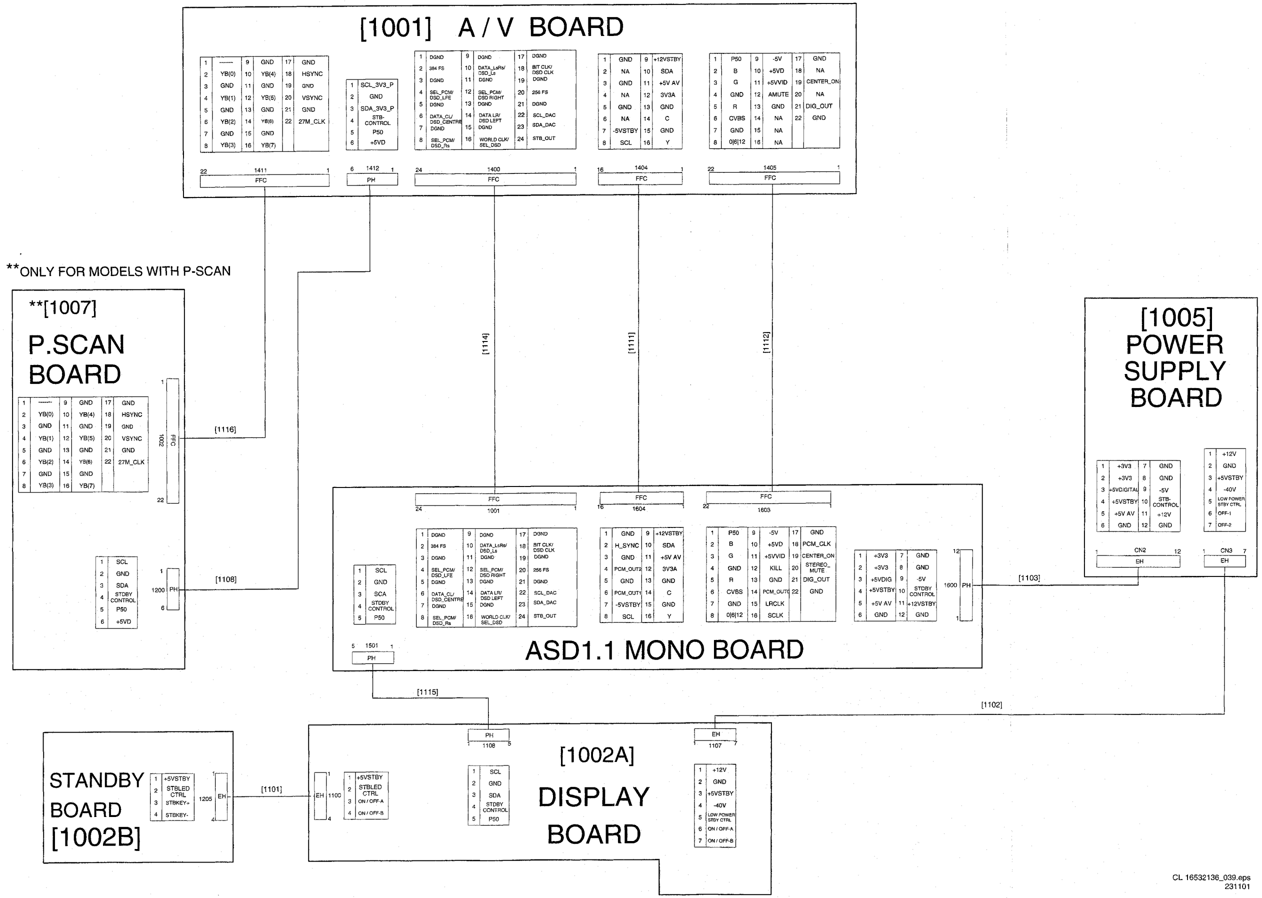
Activate the Base management and check the audio Pinknoise amplitude at the Subwoofer audio cinch outputs.

Ref.#	Command Name	Remarks	Subwoofer Output
69a	Base Normal	Base Mgt OFF	Amplitude < 200mVpp
69b	Base Management	Base Mgt ON	Amplitude < 1Vpp

Personal notes:

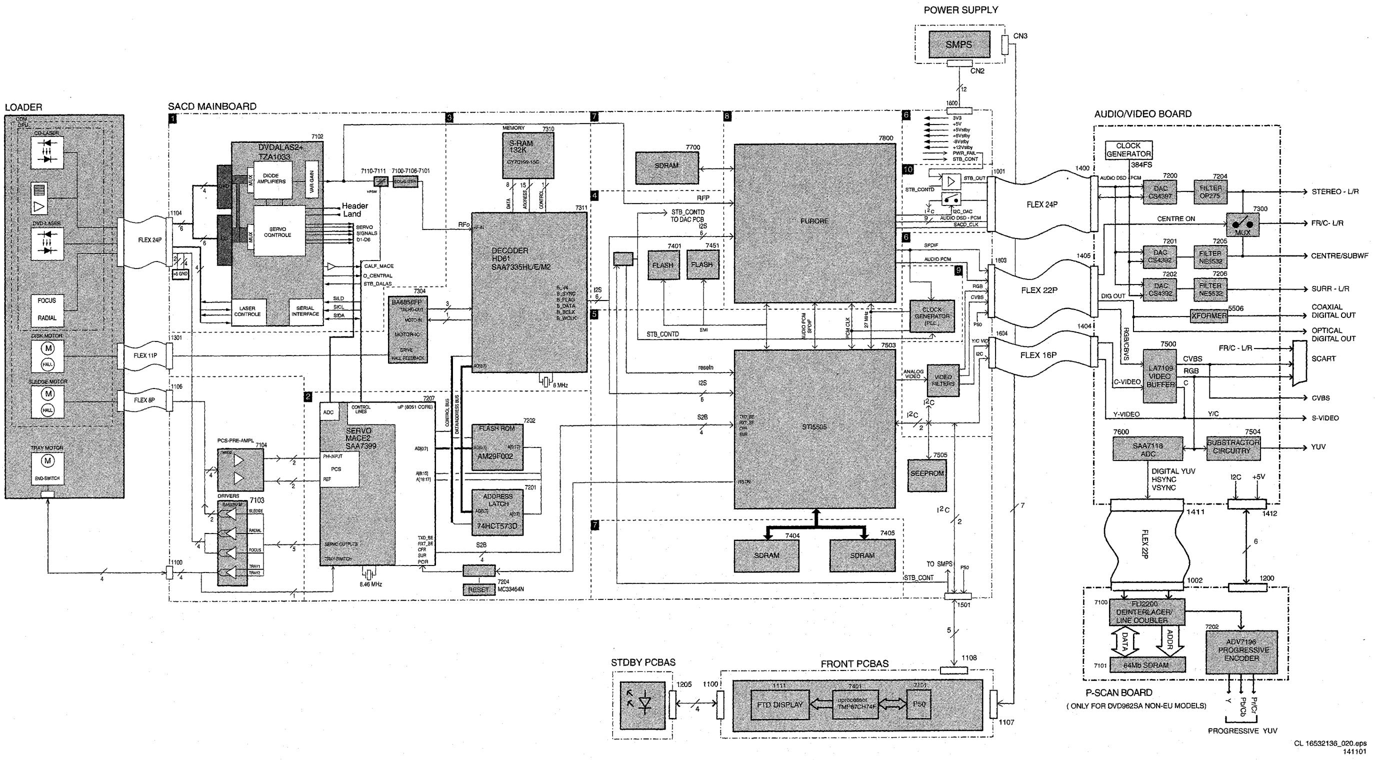
6. Wiring and Block Diagram

Wiring Diagram


[1001] A / V BOARD
1411 FFC
1412 PH
1400 FFC
1404 FFC
1405 FFC
**ONLY FOR MODELS WITH P-SCAN
**[1007]
P.SCAN BOARD
1002 FFC
1200 PH
[1116]
[1108]
[1114]
[1111]
[1112]
ASD1.1 MONO BOARD
1001 FFC
1604 FFC
1603 FFC
1600 PH
1501 PH
[1103]
[1005]
POWER SUPPLY BOARD
CN2 EH
CN3 EH
[1115]
[1102]
[1002A]
DISPLAY BOARD
1108 PH
1107 EH
1100 EH
[1101]
STANDBY BOARD
[1002B]
1205 EH

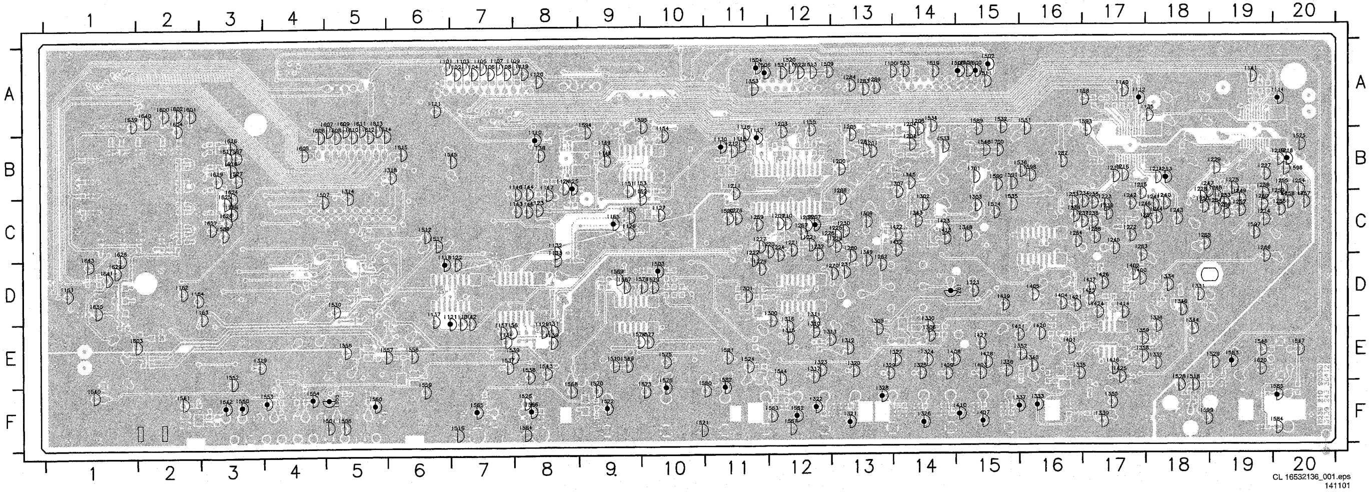
CL 16532136_039.eps
231101

General Block Diagram


POWER SUPPLY
SMPS
CN3
CN2
LOADER
SACD MAINBOARD
CD-LASER
DVD-LASER
FOCUS
RADIAL
DISK MOTOR
SLEDGE MOTOR
TRAY MOTOR
END-SWITCH
HALL
FLEX 24P
FLEX 11P
FLEX 6P
DVDALAS2+
TZA1033
DIODE AMPLIFIERS
SERVO CONTROLE
VAR GAIN
LASER CONTROLE
SERIAL INTERFACE
Header
Land
SERVO SIGNALS D1-D6
CALF_MACE
O_CENTRAL
STB_DALAS
SILD
SICL
SIDA
BA6856FP
MEMORY
S-RAM 132K
CY7C199-15C
DECODER HD61 SAA7335HL/E/M2
RFo
8 MHz
SERVO MACE2 SAA7399
PCS-PRE-AMPL
PCS
DRIVERS
SERVO OUTPUTS
TRAY-SWITCH
8.46 MHz
FLASH ROM AM29F002
ADDRESS LATCH 74HCT573D
RESET
MC33464N
S2B
SDRAM
FLASH
FLASH
FURORE
STB_CONTD TO DAC PCB
RFP
I2S
STB_CONTD
resetn
STI5505
SDRAM
SDRAM
SEEPROM
CLOCK GENERATOR (PLL)
VIDEO FILTERS
ANALOG VIDEO
TO SMPS
STB_CONT
STB_OUT
I2C_DAC
AUDIO DSD - PCM
SACD_CLK
SPDIF
AUDIO PCM
RGB
CVBS
Y/C VID
I2C
3V3
+5V
+5Vstby
-8Vstby
+12Vstby
PWR_FAIL
STB_CONT
FLEX 24P
FLEX 22P
FLEX 16P
AUDIO/VIDEO BOARD
CLOCK GENERATOR
384FS
DAC CS4397
FILTER OP275
MUX
CENTRE ON
DAC CS4392
FILTER NE5532
DAC CS4392
FILTER NE5532
XFORMER
DIG OUT
LA7109 VIDEO BUFFER
C-VIDEO
Y-VIDEO
CVBS
RGB
C
Y/C
FR/C - L/R
SAA7118 ADC
SUBSTRACTOR CIRCUITRY
DIGITAL YUV HSYNC VSYNC
STEREO - L/R
FR/C- L/R
CENTRE/SUBWF
SURR - L/R
COAXIAL DIGITAL OUT
OPTICAL DIGITAL OUT
SCART
CVBS
S-VIDEO
YUV
I2C +5V
FLEX 22P
P-SCAN BOARD
(ONLY FOR DVD962SA NON-EU MODELS)
FLI2200 DEINTERLACER/ LINE DOUBLER
64Mb SDRAM
DATA
ADDR
ADV7196 PROGRESSIVE ENCODER
Y
Pb/Cb
Pr/Cr
PROGRESSIVE YUV
STDBY PCBAS
FRONT PCBAS
FTD DISPLAY
uprocessor TMP87CH74F
P50
CL 16532136_020.eps
141101

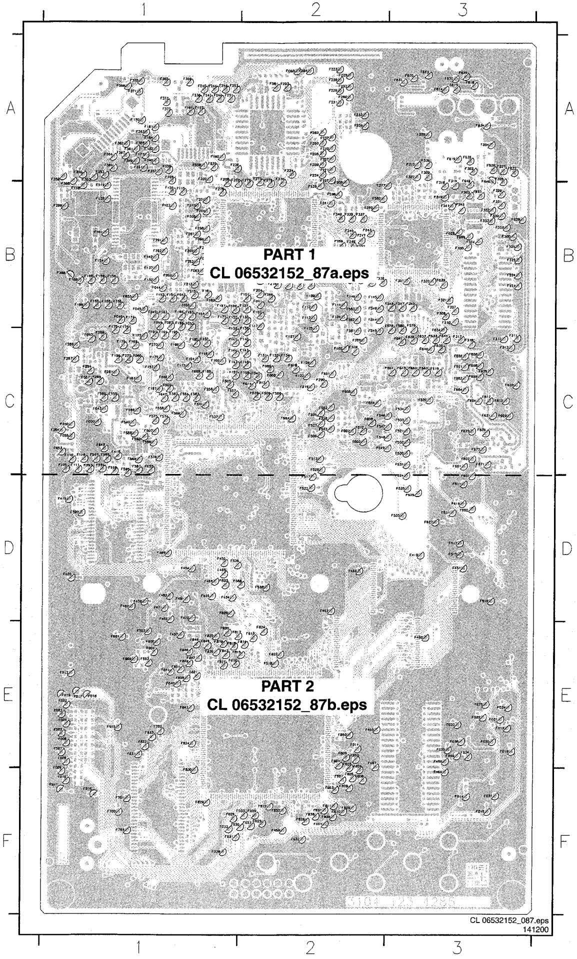
Testpoint Overview AV Board: (Bottom Side)

I100	A13
I101	A6
I102	A7
I103	A7
I104	A7
I105	A7
I106	A7
I107	A7
I108	A7
I109	A8
I110	B8
I111	A6
I112	A17
I113	D7
I114	A20
I115	B11
I116	A11
I117	A11
I118	C6
I119	A8
I120	A8
I121	D6
I122	C7
I123	C8
I124	B8
I125	B8
I126	C9
I127	C10
I129	E8
I130	B11
I131	E8
I132	C8
I133	C8
I134	E7
I135	A18
I137	D6
I138	B8
I139	E8
I140	A17
I141	A19
I142	D7
I143	C8
I144	B8
I145	C8
I146	B8
I147	B8
I148	B9
I149	B9
I150	C9
I151	B9
I152	B9
I153	B9
I154	A10
I155	A12
I156	E7
I157	E7
I158	A17
I161	D1
I162	D2
I163	D3
I164	D2
I165	C9
I200	B13
I201	B13
I202	B14
I203	A12
I204	A14
I205	A13
I206	A14
I207	C12
I208	C12
I209	C12
I210	C12
I211	B11
I212	B11
I213	B18
I214	B18
I215	B17
I216	B17
I217	B17
I218	B20
I219	B20
I220	C11
I221	C12
I222	C11
I223	D15
I224	C12
I225	C13
I226	C12
I227	B19
I228	B18
I229	B19
I230	C13
I231	D13
I232	C12
I233	C16
I234	C17
I235	C17
I236	C16
I237	C16
I238	C17
I239	C17
I240	C18
I241	C18
I242	C17
I243	C18
I244	C18
I245	C17
I246	C17
I247	B18
I248	B19
I249	C19
I250	C18
I251	C19
I252	C19
I253	C19
I254	B20
I255	B20
I256	B19
I257	C20
I258	C20
I259	C20
I260	C19
I261	D14
I262	D13
I263	C17
I264	C16
I265	C18
I266	C19
I267	C12
I268	B13
I269	C11
I270	D13
I271	C12
I272	C17
I273	C17
I274	C19
I275	B19
I276	C11
I277	C11
I278	D11
I279	C13
I280	C13
I281	B13
I282	B16
I283	A13
I284	A13
I285	C20
I286	C19
I287	C18
I288	C17
I289	A13
I300	D12
I301	D11
I302	C14
I303	C15
I305	E13
I306	E14
I307	B14
I309	C13
I310	E12
I311	D12
I312	E13
I313	E12
I314	B5
I315	E12
I316	D12
I317	E12
I318	B6
I319	E3
I320	E13
I321	F13
I322	F12
I323	E12
I324	E14
I325	E14
I326	F14
I327	E14
I328	F13
I329	E13
I330	E14
I331	D18
I332	E18
I333	F16
I334	D18
I335	E16
I336	E18
I337	F15
I338	E15
I339	F17
I340	E16
I343	C14
I344	E18
I345	B14
I346	D18
I348	C15
I349	C13
I352	E16
I353	A11
I355	F17
I358	E17
I359	E17
I400	D17
I401	E16
I402	D17
I403	E15
I404	D16
I405	D16
I407	F15
I408	E14
I409	E14
I410	F15
I411	E15
I412	C14
I413	C14
I414	D17
I415	D17
I416	E17
I417	D17
I418	E15
I419	D15
I420	E16
I421	D16
I422	C14
I423	C14
I424	D17
I425	E17
I426	D17
I427	E15
I500	A15
I501	F5
I502	A15
I503	D10
I504	A11
I505	A15
I506	A11
I507	B4
I508	F5
I509	A12
I510	E9
I511	A15
I512	C6
I513	A12
I514	C15
I516	F7
I517	C6
I518	E18
I519	A14
I520	A12
I521	A12
I522	A12
I523	A14
I524	E11
I525	B20
I526	F8
I527	B3
I528	E18
I529	E19
I530	D5
I531	A16
I532	A15
I533	B14
I534	A14
I535	C15
I536	B16
I537	E7
I538	E8
I539	E7
I540	F1
I541	F2
I542	F3
I543	E8
I544	E12
I545	B7
I546	E19
I547	E20
I548	B15
I549	E9
I550	F3
I551	A15
I552	E3
I553	F4
I554	F4
I555	F5
I556	E5
I557	E5
I558	E6
I559	E6
I560	F5
I561	F12
I562	F12
I563	F12
I564	F8
I565	F7
I566	F8
I567	D9
I568	E8
I569	D9
I570	E9
I571	F10
I572	F9
I573	F10
I574	E9
I575	E10
I576	E10
I577	E10
I578	D10
I579	D10
I580	E10
I581	E11
I582	E11
I583	E19
I584	F20
I585	F20
I586	C3
I587	B3
I588	C3
I589	A15
I590	B15
I591	B15
I592	C11
I593	A17
I594	A9
I595	A10
I596	B20
I597	C19
I598	B16
I599	F18
I600	A2
I601	A2
I602	A2
I603	E1
I604	A2
I605	B4
I606	A4
I607	A5
I608	A5
I609	A5
I610	A5
I611	A5
I612	A5
I613	A5
I614	A5
I615	B6
I616	B3
I617	B3
I618	B3
I619	B3
I620	E19
I624	B3
I625	B3
I626	C3
I627	C3
I628	C1
I629	D1
I630	D1
I639	A1
I640	A2
I641	D1
I643	C1
I700	B15
I701	B15



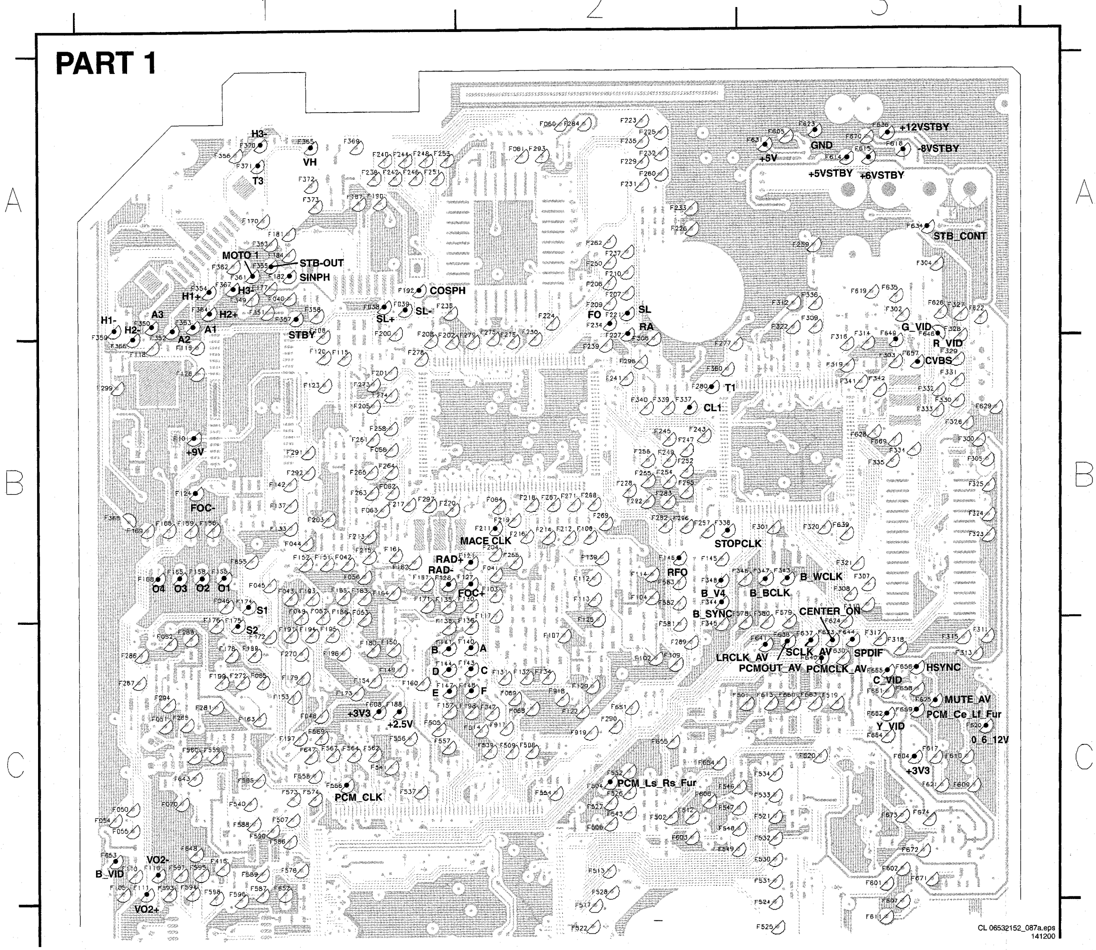
CL 16532136_001.eps
141101

Testpoint Overview Mono Board: (Overview Bottom Side)

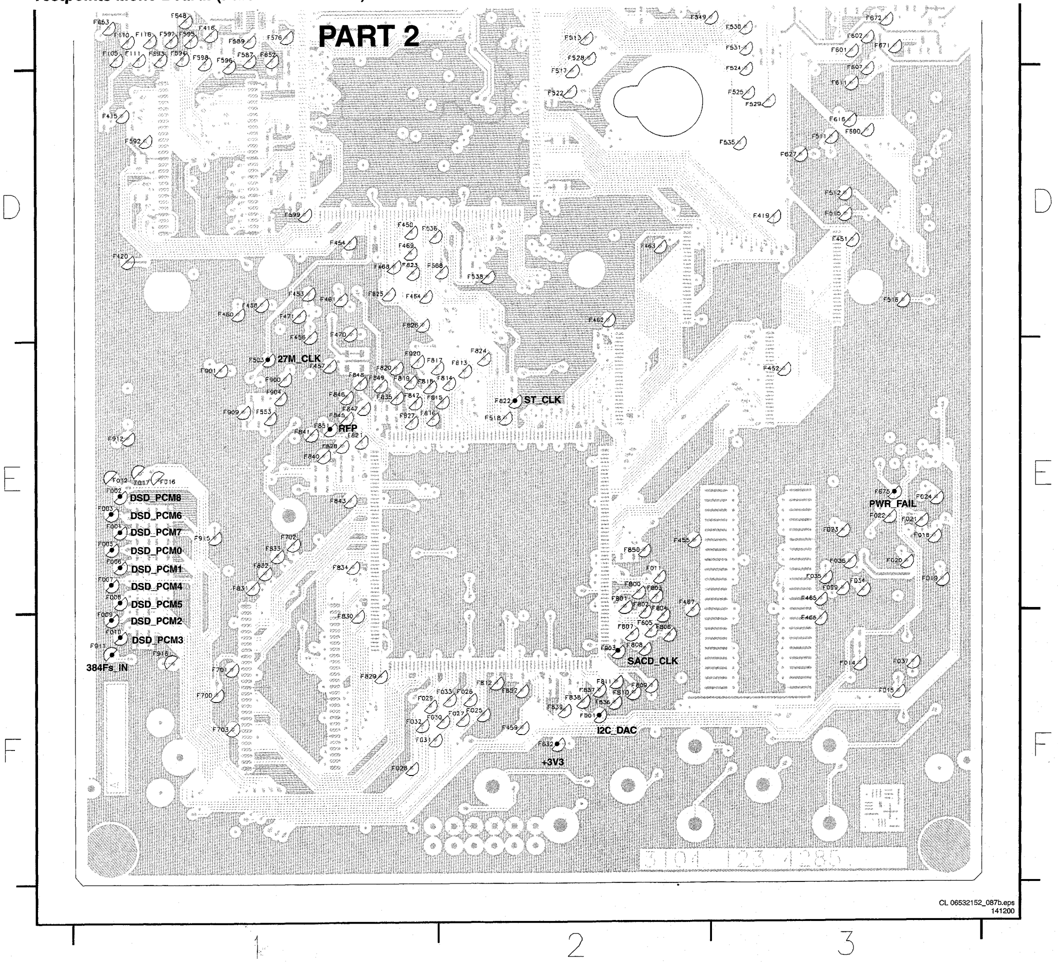


F001	F2	F157	C1	F280	B2	F505	C1	F643	C1
F002	E1	F158	B1	F281	C1	F506	C2	F644	C3
F003	E1	F159	B1	F282	B2	F507	C1	F646	A3
F004	E1	F160	C1	F283	B2	F508	C2	F647	C1
F005	E1	F161	B1	F284	A2	F509	C2	F648	C1
F006	E1	F162	B1	F285	C1	F511	D3	F649	B3
F007	E1	F163	C1	F286	C1	F512	D3	F651	C2
F008	E1	F164	B1	F287	C1	F513	C2	F652	C1
F009	F1	F165	B1	F288	C1	F514	C2	F653	C1
F010	F1	F166	B1	F289	C2	F515	D3	F654	C2
F011	E2	F167	B1	F290	C2	F516	D3	F655	C2
F012	E1	F168	B1	F291	B1	F517	D2	F656	C3
F014	F3	F169	B1	F292	B1	F518	E2	F657	B3
F015	F3	F170	A1	F293	A2	F519	C3	F658	C3
F016	E1	F171	B1	F294	C1	F520	C3	F659	C3
F017	E1	F172	C1	F295	B2	F521	C3	F660	C3
F018	E3	F173	C1	F296	B2	F522	D2	F661	C3
F019	E3	F174	B1	F297	B1	F524	D3	F662	C3
F020	E3	F175	C1	F298	B2	F525	D3	F663	C3
F021	E3	F176	C1	F299	B1	F526	C2	F664	C3
F022	E3	F177	A1	F300	B3	F527	C2	F665	C3
F023	E3	F178	C1	F301	B3	F528	C2	F669	B3
F024	E3	F179	C1	F302	A3	F529	D3	F670	A3
F025	F2	F180	C1	F303	B3	F530	C3	F671	C3
F026	F2	F181	A1	F304	A3	F531	C3	F672	C3
F027	F2	F182	A1	F305	B3	F532	C3	F673	C3
F028	F1	F183	B1	F306	B2	F533	C3	F674	C3
F029	F1	F184	A1	F307	B3	F534	C3	F675	E3
F030	F2	F185	B1	F308	B3	F535	D3	F700	F1
F031	F1	F186	B1	F309	A3	F536	D1	F701	F1
F032	F1	F187	A1	F310	B3	F537	C1	F702	E1
F033	F2	F188	C1	F311	C3	F538	D2	F703	F1
F034	E3	F189	C1	F312	A3	F539	C2	F800	E2
F035	E3	F190	A1	F313	C3	F540	C1	F801	E2
F036	E3	F191	C1	F314	B3	F541	C1	F802	E2
F037	F3	F192	A1	F315	C3	F542	A3	F803	E2
F038	A1	F193	B1	F316	B3	F543	C2	F804	F2
F039	A1	F194	C1	F317	C3	F544	A3	F805	F2
F040	A1	F195	C1	F318	C3	F545	A3	F806	F2
F041	B2	F196	C1	F319	B3	F546	C2	F807	F2
F042	B1	F197	C1	F320	B3	F547	C2	F808	F2
F043	B1	F198	C2	F321	B3	F548	C2	F809	F2
F044	B1	F199	C1	F322	A3	F549	C2	F810	F2
F045	B1	F200	A1	F323	B3	F552	C2	F811	F2
F046	B1	F201	B1	F324	B3	F553	E1	F812	F2
F047	C2	F202	B1	F325	B3	F554	C2	F813	E2
F048	C1	F203	B1	F326	B3	F555	A3	F814	E2
F049	B1	F204	B2	F327	A3	F556	C1	F815	E2
F050	C1	F205	B1	F328	A3	F557	C1	F816	E1
F051	C1	F206	A2	F329	B3	F558	C1	F817	E1
F052	C1	F207	A2	F330	B3	F559	C1	F818	E1
F053	B1	F208	B1	F331	B3	F560	C1	F819	E1
F054	C1	F209	A2	F332	B3	F562	C1	F820	E1
F055	C1	F210	A2	F333	B3	F564	C1	F821	E1
F056	B1	F211	B2	F334	B3	F566	C1	F822	E2
F060	A2	F212	B2	F335	B3	F567	C1	F823	D1
F061	A2	F213	B1	F336	A3	F568	D2	F824	E2
F062	B1	F214	B2	F337	B2	F569	C1	F825	D1
F063	B1	F215	B1	F338	B2	F573	C1	F826	D1
F064	B2	F216	B2	F339	B2	F574	C1	F827	E1
F065	C1	F217	B1	F340	B2	F576	C1	F828	E1
F066	B1	F218	B2	F341	B3	F578	C3	F829	F1
F067	B1	F219	B2	F342	B3	F579	C3	F830	F1
F068	C2	F220	B1	F343	B3	F580	C3	F831	E1
F069	C2	F221	A2	F344	B2	F581	C2	F832	E1
F070	C1	F222	B2	F345	C2	F582	B2	F833	E1
F099	E3	F223	A2	F346	B3	F583	B2	F834	E1
F101	B1	F224	A2	F347	B3	F585	C1	F835	E1
F102	C2	F225	A2	F348	B2	F586	C1	F836	F2
F103	B2	F226	A2	F349	A1	F587	C1	F837	F2
F104	B2	F227	A2	F350	A1	F588	C1	F838	F2
F105	C1	F228	B2	F351	A1	F589	C1	F839	F2
F106	B2	F229	A2	F352	A1	F590	C1	F840	E1
F107	C2	F230	B2	F353	A1	F592	D1	F841	E1
F108	A1	F231	A2	F354	A1	F593	C1	F842	E1
F109	C2	F232	A2	F355	A1	F594	C1	F843	E1
F110	C1	F233	A2	F356	A1	F595	C1	F845	E1
F111	C1	F234	A2	F357	A1	F596	C1	F846	E1
F112	B2	F235	A2	F358	A1	F597	C1	F847	E1
F113	B2	F236	A1	F359	A1	F598	C1	F848	E1
F114	B2	F237	A2	F360	B2	F599	D1	F849	E1
F115	B1	F238	A1	F361	A1	F600	D3	F850	E2
F116	C1	F239	B2	F362	A1	F601	C3	F851	E1
F117	B2	F240	A1	F363	A1	F602	C3	F852	F2
F118	B1	F241	B2	F364	A1	F603	C2	F855	B1
F119	B1	F242	A1	F365	A1	F604	C3	F900	E1
F120	B1	F243	B2	F366	A1	F605	A3	F901	E1
F121	B2	F244	A1	F367	A1	F606	C2	F903	F2
F122	C2	F245	B2	F369	A1	F607	D3	F904	E1
F123	B1	F246	A1	F370	A1	F608	C1	F909	E1
F124	B1	F247	B2	F371	A1	F609	C3	F911	F1
F125	C2	F248	A1	F372	A1	F610	C3	F912	E1
F126	B1	F249	B2	F373	A1	F611	D3	F915	E1
F127	B2	F250	A2	F415	D1	F612	C2	F916	F1
F128	B1	F251	A1	F416	C1	F613	C3	F917	C2
F129	C2	F252	B2	F419	D3	F614	A3	F918	C2
F130	B2	F253	A1	F420	D1	F615	A3	F919	C2
F131	C2	F254	B2	F450	D1	F616	D3	F920	E1
F132	C2	F255	B2	F451	D3	F617	C3	F921	F2
F133	B1	F256	B2	F452	E3	F618	A3	F922	F2
F134	C2	F257	B2	F453	D1	F619	A3	F923	F3
F135	B1	F258	B1	F454	D1	F620	C3	F924	F2
F136	C2	F259	A3	F455	E2	F621	C3	F925	F3
F137	B1	F260	A2	F456	D1	F622	A3	F926	F3
F138	C1	F261	B1	F457	E1	F623	A3	F927	F2
F139	B2	F262	A2	F458	D1	F624	C3	F928	E1
F140	C2	F263	B1	F459	F2	F625	C3	F929	F2
F141	C1	F264	B1	F460	D1	F626	A3		
F142	B1	F265	B1	F461	D1	F627	D3		
F143	C2	F266	B2	F462	D2	F628	B3		
F144	C1	F267	B2	F463	D2	F629	B3		
F145	B2	F268	B2	F464	D1	F630	C3		
F146	B2	F269	B2	F465	E3	F631	A3		
F147	C1	F270	C1	F466	F3	F632	F2		
F148	C2	F271	B2	F467	E2	F633	C3		
F149	C1	F272	C1	F468	D1	F634	A3		
F150	C1	F273	B1	F469	D1	F635	A3		
F151	B1	F274	B1	F470	D1	F636	A3		
F152	B1	F275	B2	F471	D1	F637	C3		
F153	C1	F276	B2	F501	C3	F638	C3		
F154	C1	F277	B2	F502	C2	F639	B3		
F155	B1	F278	B1	F503	E1	F640	C3		
F156	B1	F279	B2	F504	C2	F641	C3		

Testpoints Mono Board: (Part 1 Bottom Side)


1
2
3
A
B
C
PART 1
H3-
VH
T3
+12VSTBY
-8VSTBY
GND
+5V
+5VSTBY
+6VSTBY
STB_CONT
MOTO 1
STB-OUT
SINPH
H3+
H1+
H2+
A3
A1
A2
H1-
H2-
STBY
COSPH
SL+
SL-
FO
SL
RA
G_VID
R_VID
CVBS
T1
CL1
+9V
FOC-
STOPCLK
MACE CLK
RAD+
RAD-
FOC+
RFO
B_WCLK
B_V4
B_BCLK
B_SYNC
CENTER_ON
O4
O3
O2
O1
S1
S2
B
A
D
C
E
F
LRCLK_AV
SCLK_AV
SPDIF
PCMOUT_AV
PCMCLK_AV
HSYNC
C_VID
MUTE_AV
PCM_Ce_Lf_Fur
Y_VID
0_6_12V
+3V3
+2.5V
+3V3
PCM_CLK
PCM_Ls_Rs_Fur
VO2-
B_VID
VO2+
CL 06532152_087a.eps
141200

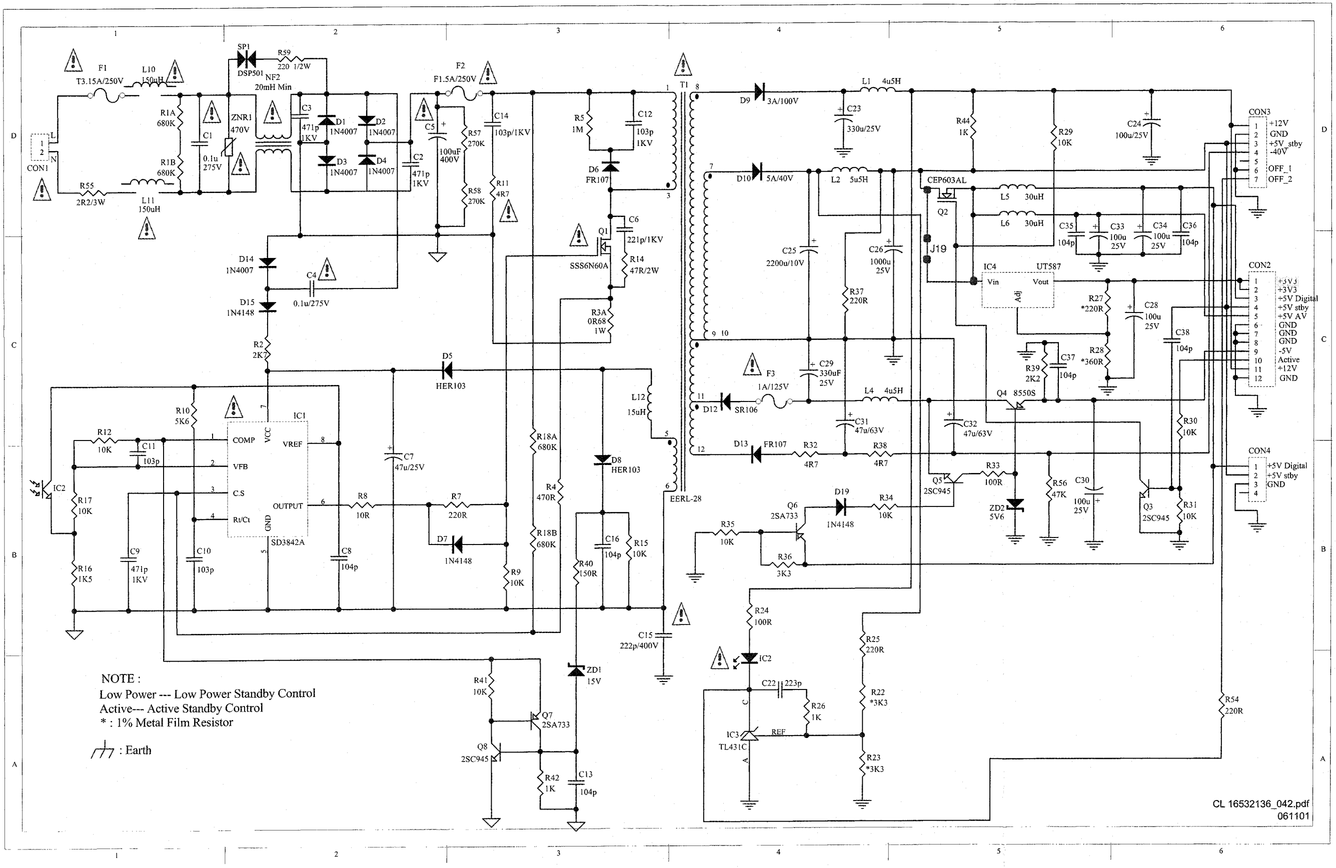
Testpoints Mono Board: (Part 2 Bottom Side)


PART 2
F503
27M_CLK
F85
RFP
F622
ST_CLK
F002
DSD_PCM8
F003
DSD_PCM6
F004
DSD_PCM7
F005
DSD_PCM0
F006
DSD_PCM1
F007
DSD_PCM4
F008
DSD_PCM5
F009
DSD_PCM2
F010
DSD_PCM3
F011
384Fs_IN
F803
SACD_CLK
F801
I2C_DAC
F632
+3V3
F575
PWR_FAIL
3104 123 4985
D
E
F
1
2
3

CL 06532152_087b.eps
141200

7. Electrical Diagrams and PWB s

Power Supply Unit SACD2001 Wide Range


1
2
3
4
5
6
D
C
B
A
CON1
L
N
F1
T3.15A/250V
L10
150uH
R55
2R2/3W
L11
150uH
R1A
680K
R1B
680K
C1
0.1u
275V
ZNR1
470V
SP1
DSP501
R59
220 1/2W
NF2
20mH Min
C3
471p
1KV
D1
1N4007
D2
1N4007
D3
1N4007
D4
1N4007
C2
471p
1KV
F2
F1.5A/250V
C5
100uF
400V
R57
270K
R58
270K
C14
103p/1KV
R11
4R7
D14
1N4007
C4
0.1u/275V
D15
1N4148
R2
2K7
R10
5K6
IC1
COMP
VFB
C.S
Rt/Ct
VCC
VREF
OUTPUT
GND
SD3842A
R12
10K
C11
103p
IC2
R17
10K
R16
1K5
C9
471p
1KV
C10
103p
C8
104p
C7
47u/25V
D5
HER103
R8
10R
R7
220R
D7
1N4148
R9
10K
R18A
680K
R18B
680K
R4
470R
R5
1M
C12
103p
1KV
D6
FR107
Q1
SSS6N60A
C6
221p/1KV
R14
47R/2W
R3A
0R68
1W
L12
15uH
D8
HER103
C16
104p
R15
10K
R40
150R
ZD1
15V
C15
222p/400V
C13
104p
R41
10K
Q7
2SA733
Q8
2SC945
R42
1K
T1
EERL-28
D9
3A/100V
L1 4u5H
C23
330u/25V
D10
5A/40V
L2 5u5H
C25
2200u/10V
C26
1000u
25V
R37
220R
F3
1A/125V
C29
330uF
25V
D12
SR106
L4 4u5H
C31
47u/63V
D13
FR107
R32
4R7
R38
4R7
R44
1K
R29
10K
C24
100u/25V
CEP603AL
Q2
J19
L5 30uH
L6 30uH
C35
104p
C33
100u
25V
C34
100u
25V
C36
104p
IC4
UT587
Vin
Vout
Adj
R27
*220R
C28
100u
25V
C38
104p
C37
104p
R39
2K2
R28
*360R
Q4 8550S
C32
47u/63V
Q5
2SC945
R33
100R
ZD2
5V6
R56
47K
C30
100u
25V
Q3
2SC945
R30
10K
R31
10K
Q6
2SA733
D19
1N4148
R34
10K
R35
10K
R36
3K3
R24
100R
IC2
C22
223p
R26
1K
IC3
TL431C
REF
R25
220R
R22
*3K3
R23
*3K3
R54
220R
CON3
+12V
GND
+5V_stby
-40V
OFF_1
OFF_2
CON2
+3V3
+3V3
+5V Digital
+5V stby
+5V AV
GND
GND
GND
-5V
Active
+12V
GND
CON4
+5V Digital
+5V stby
GND

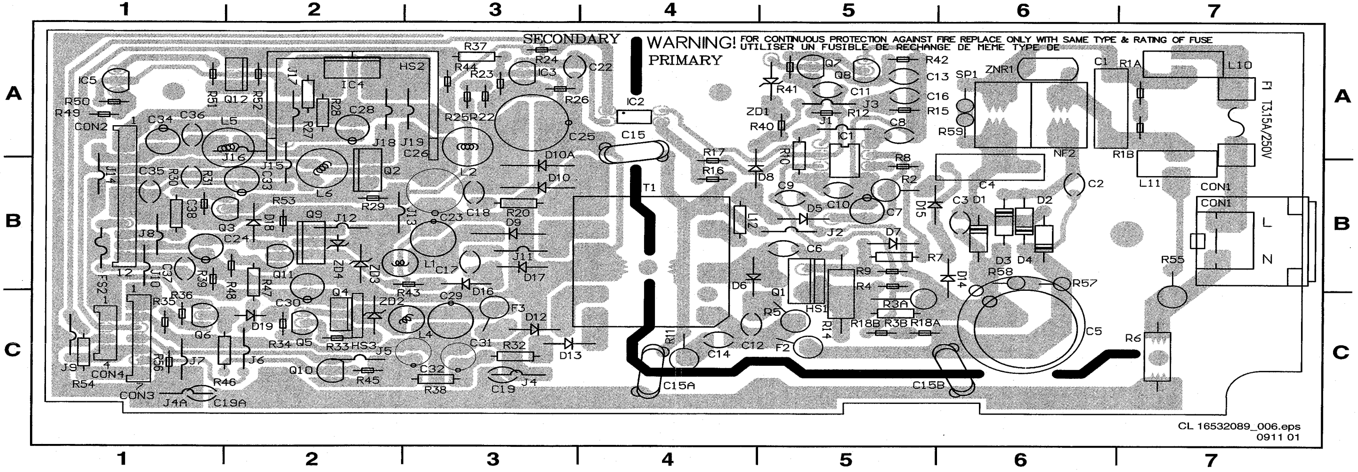
NOTE :
Low Power --- Low Power Standby Control
Active--- Active Standby Control
* : 1% Metal Film Resistor

: Earth

CL 16532136_042.pdf
061101

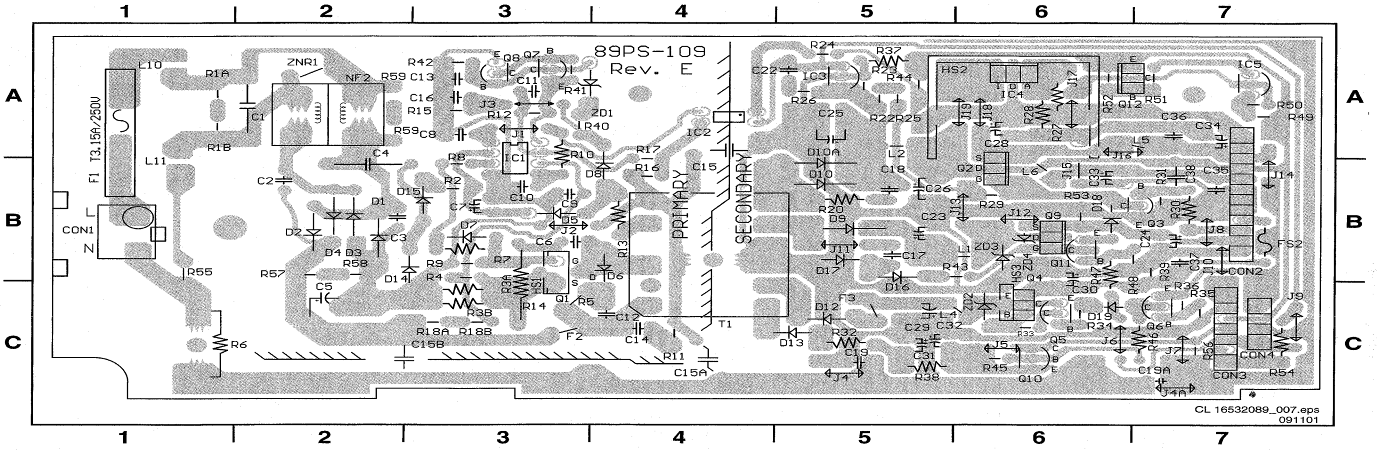
Layout Power Supply Unit (Top Side)

C1	D1	C10	B1	C24	D6	C34	D6	D1	D2	D10	D4	IC1	C2	L6	D5	Q5	B5	R5	D3	R16	B1	R27	C5	R36	B4	R55	D1	ZNR1	D2
C2	D2	C11	B1	C25	C4	C35	D5	D2	D2	D12	C4	IC2	B1	L10	D1	Q6	B4	R7	B3	R17	B1	R28	C5	R37	C4	R56	B5		
C3	D2	C12	D3	C26	C4	C36	D6	D3	D2	D13	B4	IC2	A4	L11	D1	Q7	A3	R8	B2	R18A	C3	R29	D5	R38	B4	R57	D3		
C4	C2	C13	A3	C28	C6	C37	C5	D4	D2	D14	C2	IC3	A4	L12	C3	Q8	A3	R9	B3	R18B	B3	R30	C6	R39	C5	R58	D3		
C5	D2	C14	D3	C29	C4	C38	C6	D5	C2	D15	C2	IC4	C5	NF2	D2	R1A	D1	R10	C1	R22	A4	R31	B6	R40	B3	R59	D2		
C6	D3	C15	B3	C30	B5	CON1	D1	D6	D3	D19	B4	J19	C5	Q1	D3	R1B	D1	R11	D3	R23	A4	R32	B4	R41	A3	SP1	D2		
C7	B2	C16	B3	C31	C4	CON2	C6	D7	B2	F1	D1	L2	D4	Q2	D5	R2	C2	R12	C1	R24	B4	R33	B5	R42	A3	T1	D4		
C8	B2	C22	A4	C32	C5	CON3	D6	D8	B3	F2	D3	L4	C4	Q3	B6	R3A	C3	R14	C3	R25	B4	R34	B4	R44	D5	ZD1	A3		
C9	B1	C23	D4	C33	D6	CON4	B6	D9	D4	F3	C4	L5	D5	Q4	C5	R4	B3	R15	B3	R26	A4	R35	B4	R54	A6	ZD2	B5		


1
2
3
4
5
6
7
A
B
C
SECONDARY
WARNING!
FOR CONTINUOUS PROTECTION AGAINST FIRE REPLACE ONLY WITH SAME TYPE & RATING OF FUSE
UTILISER UN FUSIBLE DE RECHANGE DE MEME TYPE DE
PRIMARY
F1 T3.15A/250V
CON1
L
N
IC5
R50
R49
CON2
C34
C36
L5
J16
C35
J14
R30
R31
C38
C33
J15
R53
Q3
C24
D18
J8
C37
R39
Q11
FS2
R35
R36
Q6
J7
J9
R54
CON4
R56
R46
J6
CON3
J4A
C19A
R51
Q12
R52
J17
IC4
R28
R27
C28
J18
J19
HS2
C26
L6
Q2
Q9
J12
ZD4
ZD3
R47
R48
C30
Q4
ZD2
R34
Q5
R33
HS3
J5
Q10
R45
D19
R29
J13
C23
L1
C17
R43
L4
C29
D16
C32
R38
C31
R32
C19
J4
R37
R44
R23
R25
R22
IC3
R24
C22
R26
C25
D10A
D10
L2
C18
R20
D9
J11
D17
F3
D12
D13
IC2
C15
T1
R11
C15A
C14
C12
F2
R17
R16
D8
R10
ZD1
R40
R41
Q7
Q8
C11
J3
R12
J1
IC1
C9
D5
C10
C7
L12
J2
C6
D6
Q1
HS1
R5
R14
R9
R4
R3A
R18B
R3B
R18A
D7
R7
D14
R42
C13
C16
R15
C8
R8
R2
D15
SP1
R59
ZNR1
NF2
C4
C3
D1
D2
D3
D4
R58
R57
C5
C15B
C1
R1A
R1B
L10
L11
C2
R55
R6
CL 16532089_006.eps
0911 01

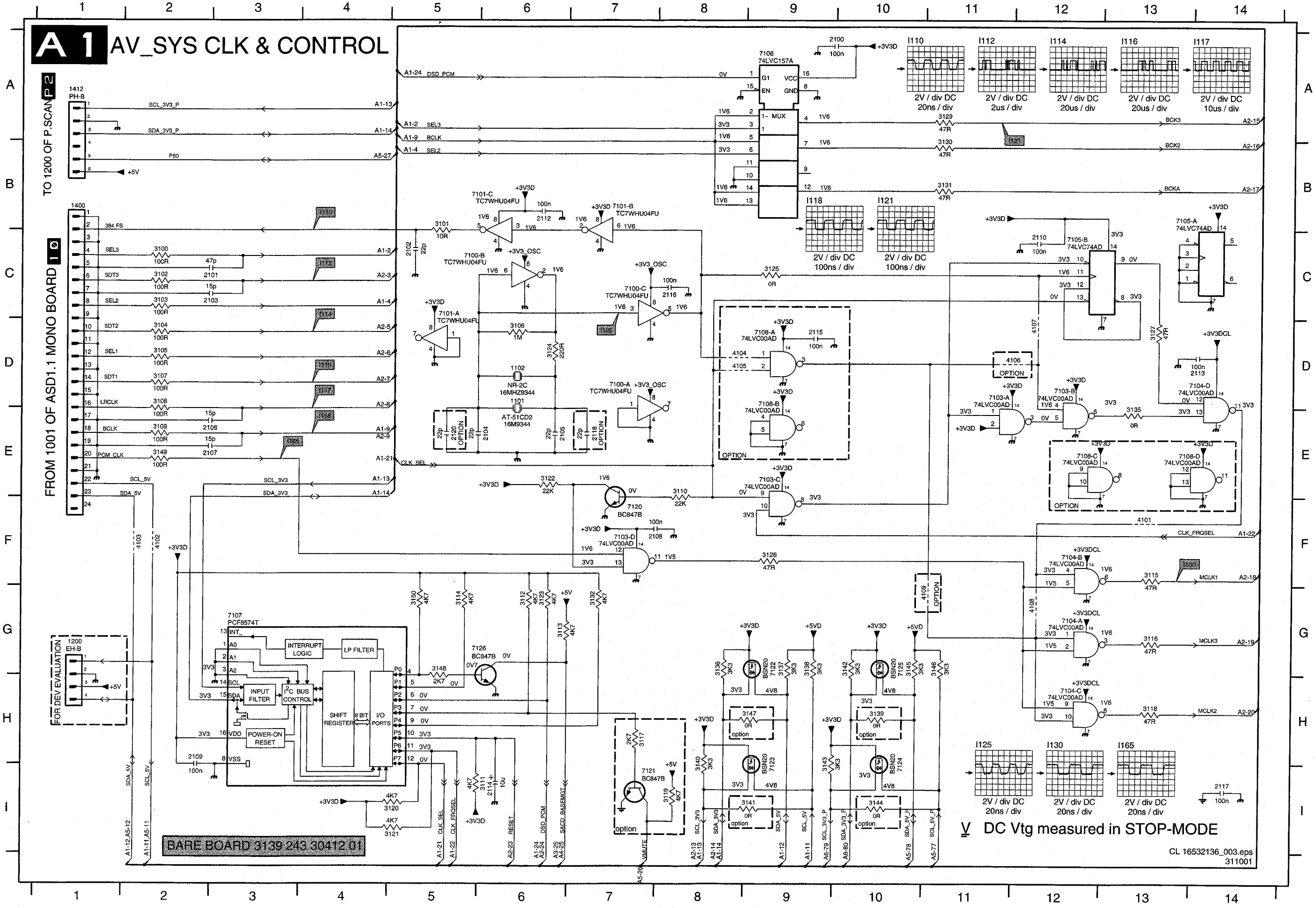
Layout Power Supply Unit (Bottom Side)

C1	A2	C12	C4	C23	B5	C36	A7	D6	B4	D18	B6	IC5	A7	J11	B5	L6	B6	Q9	B6	R7	B3	R18B	C3	R32	C5	R44	A5	R57	B2
C1	A2	C13	A3	C24	B7	C37	B7	D7	B3	D19	C6	J1	A3	J12	B6	L10	A1	Q10	C6	R8	A3	R20	B5	R33	C6	R45	C6	R58	B2
C2	B2	C14	C4	C25	A5	C38	B7	D8	B4	F1	B1	J2	B3	J14	B7	L11	B1	Q11	B6	R9	B3	R22	A5	R34	C6	R46	C7	R59	A2
C3	B2	C15	B4	C26	B5	CON1	B1	D9	B5	F2	C3	J3	A3	J15	B6	NF2	A2	Q12	A6	R10	A3	R23	A5	R35	C7	R47	B6	T1	C4
C4	A2	C15A	C4	C28	A6	CON2	B7	D10	B5	F3	C5	J4	C5	J16	A6	Q1	C3	R1A	A1	R11	C4	R24	A5	R36	C7	R48	C7	ZD1	A4
C5	C2	C15B	C3	C29	C5	CON3	C7	D10A	A5	FS2	B7	J4A	C7	J17	A6	Q2	B6	R1B	A1	R12	A3	R25	A5	R37	A5	R49	A7	ZD2	C6
C6	B3	C16	A3	C30	C6	CON4	C7	D12	C5	HS1	C3	J5	C6	J18	A6	Q3	B7	R2	B3	R13	B4	R26	A5	R38	C5	R50	A7	ZD3	B6
C7	B3	C17	B5	C31	C5	D1	B2	D13	C5	HS2	A6	J6	C6	J19	A6	Q4	B6	R3A	C3	R14	C3	R27	A6	R39	B7	R51	A7	ZD4	B6
C8	A3	C18	B5	C32	C5	D2	B2	D14	B2	HS3	B6	J7	C7	L1	B6	Q5	C6	R3B	C3	R15	A3	R28	A6	R40	A4	R52	A6	ZNR1	A2
C9	B3	C19	C5	C33	B6	D3	B2	D15	B2	IC2	A4	J8	B7	L2	A5	Q6	C7	R4	B3	R16	B4	R29	B6	R41	A3	R53	B6		
C10	B3	C19A	C7	C34	A7	D4	B2	D16	C5	IC3	A5	J9	C7	L4	C5	Q7	A3	R5	C3	R17	A4	R30	B7	R42	A3	R54	C7		
C11	A3	C22	A4	C35	B7	D5	B3	D17	B5	IC4	A6	J10	B7	L5	A7	Q8	A3	R6	C1	R18A	C3	R31	B7	R43	B5	R56	C7		


1
2
3
4
5
6
7
A
B
C
89PS-109
Rev. E
PRIMARY
SECONDARY
F1 T3.15A/250V
CON1
L
N
L10
L11
R1A
R1B
ZNR1
NF2
C1
C2
C4
R55
R57
R6
IC1
IC2
IC3
IC4
IC5
HS1
HS2
HS3
T1
F2
F3
FS2
CON2
CON3
CON4

CL 16532089_007.eps
091101

AV Board: Sys Clk & Control


A1 AV_SYS CLK & CONTROL
TO 1200 OF P.SCAN P2
FROM 1001 OF ASD1.1 MONO BOARD 1 Ø
FOR DEV EVALUATION
1412 PH-B
1400
1200 EH-B
7106 74LVC157A
7101-A TC7WHU04FU
7101-B TC7WHU04FU
7101-C TC7WHU04FU
7100-A TC7WHU04FU
7100-B TC7WHU04FU
7100-C TC7WHU04FU
1102 NR-2C 16MHZ9344
1101 AT-51CD2 16M9344
7105-A 74LVC74AD
7105-B 74LVC74AD
7108-A 74LVC00AD
7108-B 74LVC00AD
7108-C 74LVC00AD
7108-D 74LVC00AD
7103-A 74LVC00AD
7103-B 74LVC00AD
7103-C 74LVC00AD
7103-D 74LVC00AD
7104-A 74LVC00AD
7104-B 74LVC00AD
7104-C 74LVC00AD
7104-D 74LVC00AD
7120 BC847B
7126 BC847B
7121 BC847B
7107 PCF8574T
INTERRUPT LOGIC
LP FILTER
INPUT FILTER
I²C BUS CONTROL
SHIFT REGISTER
8 BIT
I/O PORTS
POWER-ON RESET
BSN20 7122
BSN20 7123
BSN20 7124
BSN20 7125
OPTION
option
I110 2V / div DC 20ns / div
I112 2V / div DC 2us / div
I114 2V / div DC 20us / div
I116 2V / div DC 20us / div
I117 2V / div DC 10us / div
I118 2V / div DC 100ns / div
I121 2V / div DC 100ns / div
I125 2V / div DC 20ns / div
I130 2V / div DC 20ns / div
I165 2V / div DC 20ns / div
BCK3
BCK2
BCKA
MCLK1
MCLK3
MCLK2
CLK_FRQSEL
CLK_SEL
DSD_PCM
SCL_3V3_P
SDA_3V3_P
P50
384 FS
SEL3
SDT3
SEL2
SDT2
SEL1
SDT1
LRCLK
BCLK
PCM_CLK
SCL_5V
SDA_5V
SCL_3V3
SDA_3V3
RESET
SACD_BASEMGT
VMUTE
BARE BOARD 3139 243 30412 01
V DC Vtg measured in STOP-MODE
CL 16532136_003.eps 311001

1101	D6
1102	D6
1200	G1
1400	B1
1412	A1
2100	A9
2101	C2
2102	C5
2103	C2
2104	E6
2105	E6
2106	E2
2107	E2
2108	F7
2109	H2
2110	C12
2112	B6
2113	D14
2114	I6
2115	D9
2116	C8
2117	I14
2118	E7
2120	E5
3100	C2
3101	B5
3102	C2
3103	C2
3104	D2
3105	D2
3106	D6
3107	D2
3108	D2
3109	E2
3110	E8
3111	I6
3112	G6
3113	G6
3114	G5
3115	F13
3116	G13
3117	H7
3118	H13
3119	I8
3120	I5
3121	I5
3122	E6
3123	G6
3124	D6
3125	C9
3127	D13
3128	F9
3129	A11
3130	B11
3131	B11
3132	G7
3135	E13
3136	G8
3137	G9
3138	G9
3139	H10
3140	I8
3141	I9
3142	G10
3143	I9
3144	I10
3145	G10
3146	G11
3147	H9
3148	G5
3149	E2
3150	G5
4101	F13
4102	F2
4103	F2
4104	D8
4105	D8
4106	D11
4107	D12
4108	G12
4109	G11
7100-A	D7
7100-B	C5
7100-C	C7
7101-A	C5
7101-B	B7
7101-C	B6
7103-A	D11
7103-B	D12
7103-C	E9
7103-D	F7
7104-A	G12
7104-B	F12
7104-C	H12
7104-D	D13
7105-A	B13
7105-B	C12
7106	A9
7107	G3
7108-A	D9
7108-B	D9
7108-C	E12
7108-D	E13
7120	F7
7121	I7
7122	G9
7123	I9
7124	I10
7125	G10
7126	G5

Diversity Tables AV Board

DIVERSITY TABLE FOR DIAGRAM A1

ITEM NO	DESCRIPTION	DVD962SA/171 DVD962SA/691	DVD962SA/001	SACD900/171
1412	CON BM V 6P M 2.00 PH B	X		
3142	RST SM 0603 3K3 PM5 COL	X		
3143	RST SM 0603 3K3 PM5 COL	X		
3145	RST SM 0603 3K3 PM5 COL	X		
3146	RST SM 0603 3K3 PM5 COL	X		
7124	FET SIG SM BSN20 (PHSE) R	X		
7125	FET SIG SM BSN20 (PHSE) R	X		

DIVERSITY TABLE FOR DIAGRAM A3

ITEM NO	DESCRIPTION	DVD962SA/171 DVD962SA/691	DVD962SA/001	SACD900/171
2305	CER2 0603 X7R 16V 100N COL		X	
2312	CER2 0603 X7R 16V 100N COL		X	
4300	RST SM 0603 JUMP. 0R05 COL		X	
4301	RST SM 0603 JUMP. 0R05 COL		X	
7303	IC SM LM833D (MOTA) R		X	

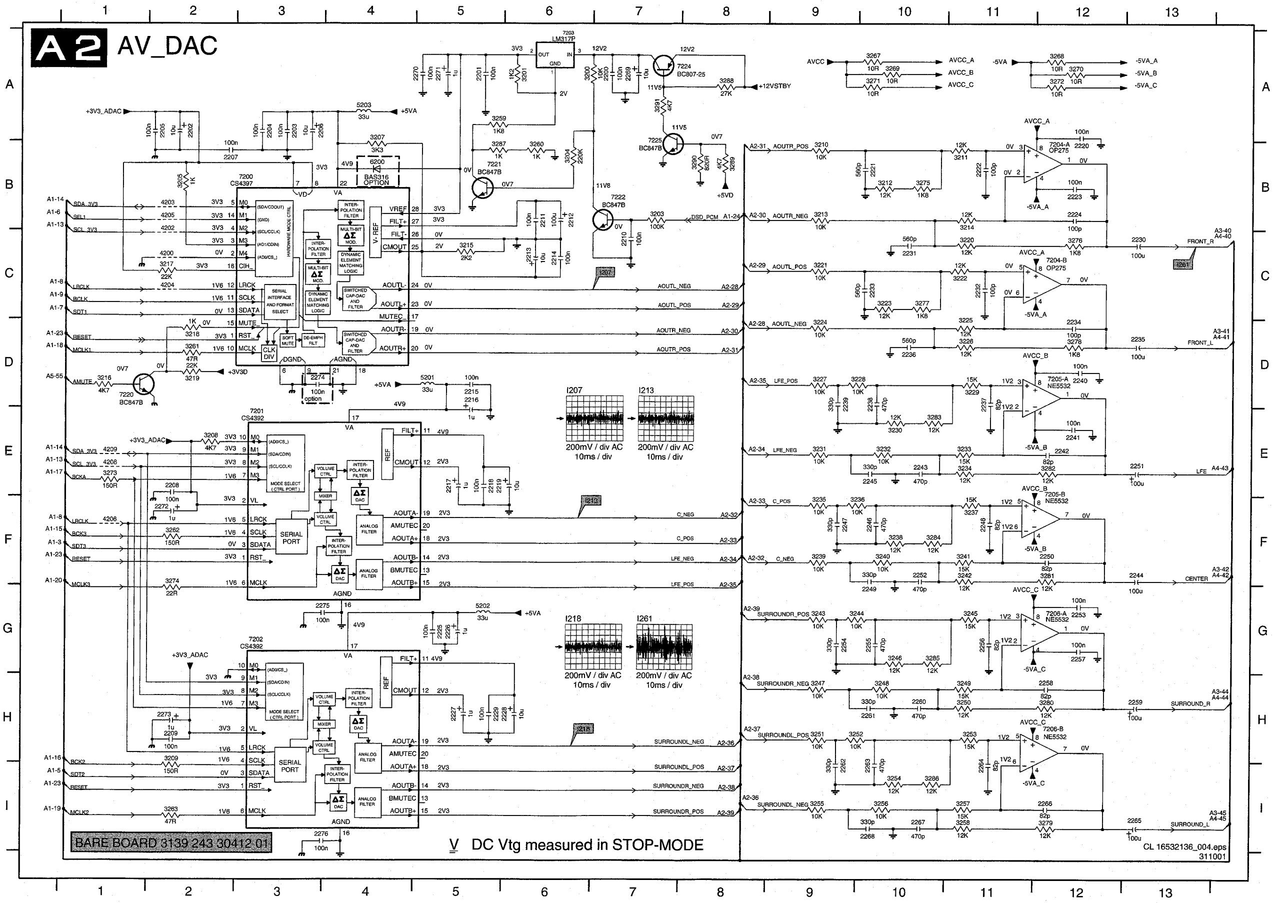
DIVERSITY TABLE FOR DIAGRAM A5

ITEM NO	DESCRIPTION	DVD962SA/171 DVD962SA/691	DVD962SA/001	SACD900/171
1407	CON BM EURO H 21P F BK GRND-L		X	
2510	CER1 0603 NP0 50V 220P COL		X	
2511	CER1 0603 NP0 50V 220P COL		X	
2512	CER1 0603 NP0 50V 220P COL		X	
2520	CER1 0603 NP0 50V 220P COL		X	
2521	CER1 0603 NP0 50V 220P COL		X	
2522	CER1 0603 NP0 50V 100P COL		X	
2523	CER1 0603 NP0 50V 220P COL		X	
2524	CER1 0603 NP0 50V 220P COL		X	
2525	ELCAP 5MM 16V 100U PM20 COL A		X	
2526	CER2 0603 X7R 16V 100N COL		X	
2527	CER1 0603 NP0 50V 220P COL		X	
2547	CER2 0603 X7R 16V 100N COL		X	
2548	ELCAP 6V3 S 1000U PM20 COL A		X	
3510	RST SM 0603 2K7 PM5 COL		X	
3511	RST SM 0603 220R PM5 COL		X	
3512	RST SM 0603 220R PM5 COL		X	
3513	RST SM 0603 2K7 PM5 COL		X	
3514	RST SM 0603 75R PM5 COL		X	
3515	RST SM 0603 220R PM5 COL		X	
3520	RST SM 0603 22K PM5 COL		X	
3521	RST SM 0603 1K PM5 COL		X	
3522	RST SM 0603 47K PM5 COL		X	
3557	RST SM 0603 1K PM5 COL		X	
4517	RST SM 0603 JUMP. 0R05 COL	X		
4518	RST SM 0603 JUMP. 0R05 COL	X		
4519	RST SM 0603 JUMP. 0R05 COL	X		X
6500	DIO REG SM BZX384-C15 COL R		X	
6501	DIO REG SM BZX384-C15 COL R		X	
6502	DIO REG SM BZX384-C15 COL R		X	
6503	DIO REG SM BZX384-C15 COL R		X	
6504	DIO REG SM BZX384-C15 COL R		X	
6509	DIO REG SM BZX384-C15 COL R		X	
6510	DIO REG SM PDZ2.4B (PHSE) R		X	
7523	TRA SIG SM BC847B (COL) R		X	
7524	TRA SIG SM BC847B (COL) R		X	
7525	TRA SIG SM BC857B (COL) R		X	
7526	TRA SIG SM BC847B (COL) R		X	

CL 16532136_002.eps
141101

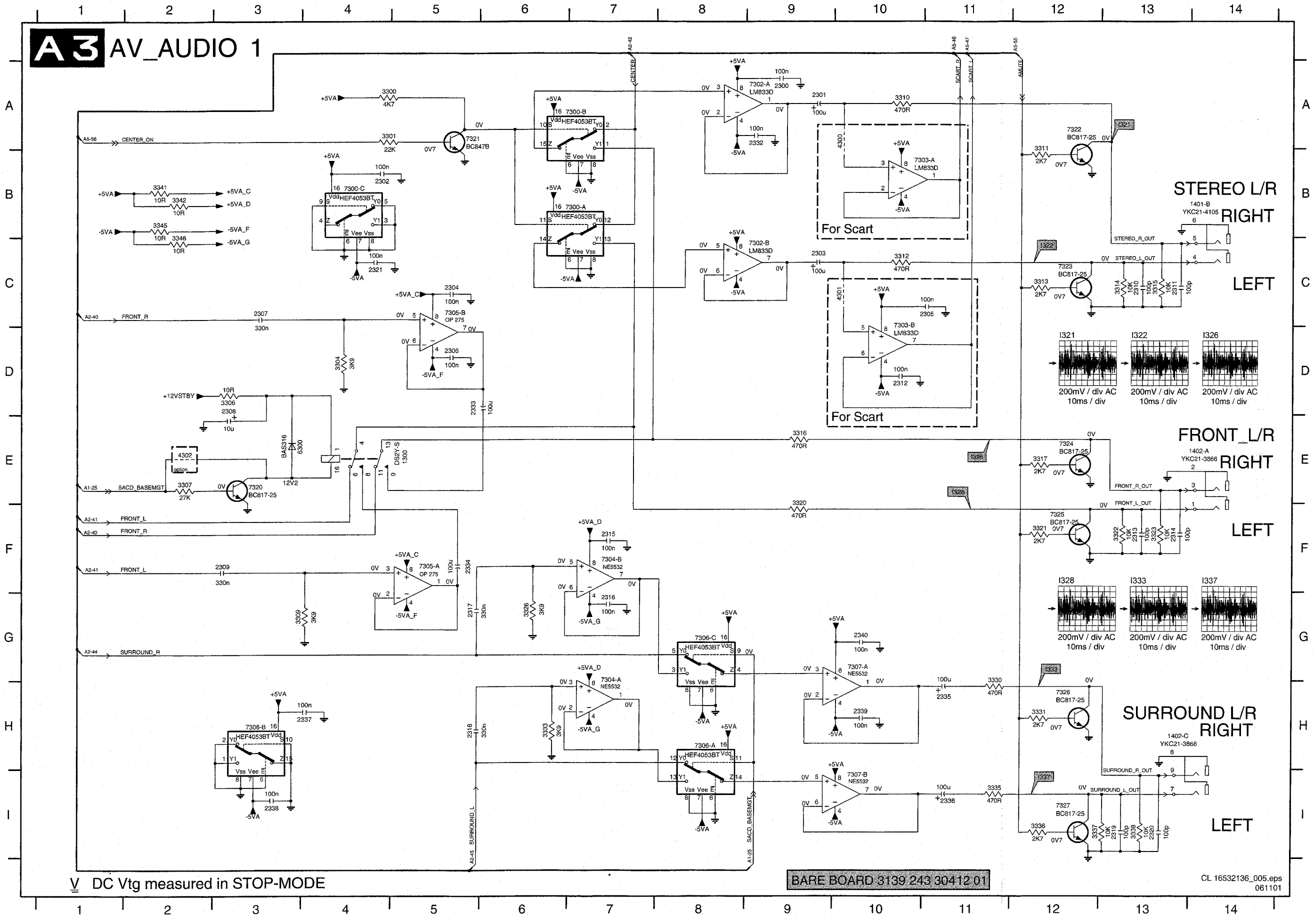
Personal Notes:

AV Board: DAC


A2 AV_DAC
7200 CS4397
7201 CS4392
7202 CS4392
7203 LM317P
7204-A OP275
7204-B OP275
7205-A NE5532
7205-B NE5532
7206-A NE5532
7206-B NE5532
7220 BC847B
7221 BC847B
7222 BC847B
7224 BC807-25
7225 BC847B
6200 BAS316 OPTION
+3V3_ADAC
+5VA
+12VSTBY
+5VD
AVCC
-5VA
AVCC_A
AVCC_B
AVCC_C
-5VA_A
-5VA_B
-5VA_C
FRONT_R
FRONT_L
LFE
CENTER
SURROUND_R
SURROUND_L
I207
I213
I218
I261
200mV / div AC
10ms / div
BARE BOARD 3139 243 30412 01
V DC Vtg measured in STOP-MODE
CL 16532136_004.eps
311001

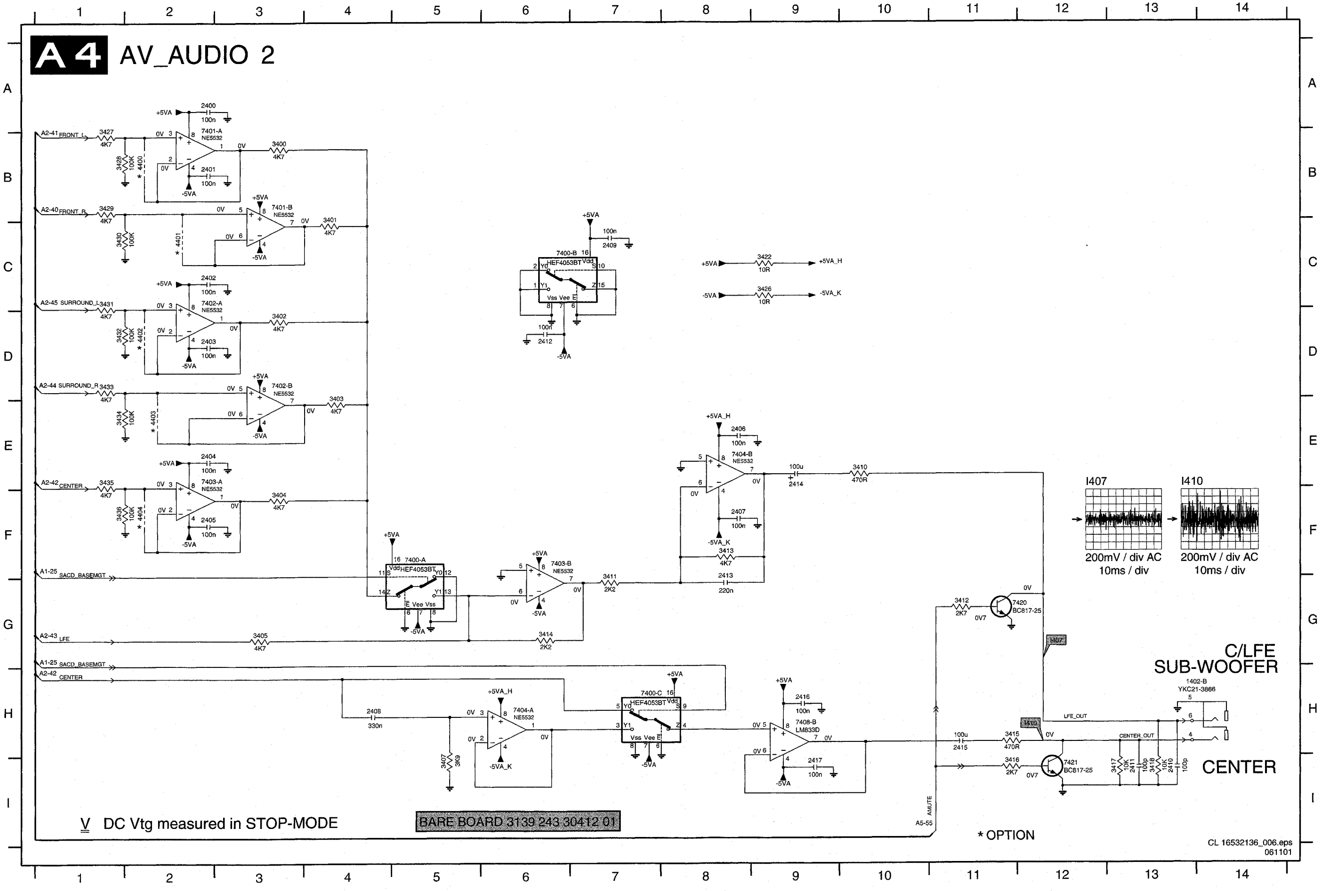
2200	A7
2201	A5
2202	A2
2203	A3
2204	A3
2205	A2
2206	A3
2207	B2
2208	E2
2209	H2
2210	C7
2211	B6
2212	B6
2213	C6
2214	C6
2215	D5
2216	D5
2217	E5
2218	E5
2219	E5
2220	B12
2221	B10
2222	B11
2223	B12
2224	B12
2225	G5
2226	G5
2227	H5
2228	H6
2229	H5
2230	C13
2231	C10
2232	C11
2233	C10
2234	D12
2235	D13
2236	D10
2237	D11
2238	D10
2239	D9
2240	D12
2241	E12
2242	E12
2243	E10
2244	F13
2245	E10
2246	F10
2247	F9
2248	F11
2249	G10
2250	F12
2251	E13
2252	F10
2253	G12
2254	G9
2255	G10
2256	G11
2257	G12
2258	H12
2259	H13
2260	H10
2261	H10
2262	I9
2263	I10
2264	I11
2265	I13
2266	I12
2267	I10
2268	I10
2269	A7
2270	A5
2271	A5
2272	F2
2273	H2
2274	D3
2275	G3
2276	I3
3200	A6
3201	A6
3203	B7
3204	B6
3205	B2
3207	A4
3208	E2
3209	H2
3210	B9
3211	B11
3212	B10
3213	B9
3214	B11
3215	C5
3216	D1
3217	C2
3218	D2
3219	D2
3220	C11
3221	C9
3222	C11
3223	C10
3224	D9
3225	C11
3226	D11
3227	D9
3228	D10
3229	D11
3230	E10
3231	E9
3232	E10
3233	E11
3234	E11
3235	F9
3236	F10
3237	F11
3238	F10
3239	F9
3240	F10
3241	F11
3242	F11
3243	G9
3244	G10
3245	G11
3246	G10
3247	H9
3248	H10
3249	H11
3250	H11
3251	H9
3252	H10
3253	H11
3254	I10
3255	I9
3256	I10
3257	I11
3258	I11
3259	A5
3260	B6
3261	D2
3262	F2
3263	I2
3267	A10
3268	A12
3269	A10
3270	A12
3271	A10
3272	A12
3273	E1
3274	F2
3275	B10
3276	C12
3277	C10
3278	D12
3279	I12
3280	H12
3281	F12
3282	E12
3283	E10
3284	F10
3285	G10
3286	I10
3287	B5
3288	A8
3289	B8
3290	B8
3291	A7
4200	C2
4202	C2
4203	B2
4204	C2
4205	B2
4206	F1
4208	E1
4209	E1
5201	D5
5202	G5
5203	A4
6200	B4
7200	B3
7201	E3
7202	G3
7203	A6
7204-A	B12
7204-B	C12
7205-A	D12
7205-B	E12
7206-A	G12
7206-B	H12
7220	D1
7221	B5
7222	B7
7224	A7
7225	B7

AV Board: Audio 1


A3 AV_AUDIO 1
1 2 3 4 5 6 7 8 9 10 11 12 13 14
A B C D E F G H I
CENTER_ON
7321 BC847B
3300 4K7
3301 22K
+5VA
+5VA_C
+5VA_D
-5VA_F
-5VA_G
3341 10R
3342 10R
3345 10R
3346 10R
7300-C HEF4053BT
7300-B HEF4053BT
7300-A HEF4053BT
7302-A LM833D
7302-B LM833D
7303-A LM833D
7303-B LM833D
For Scart
For Scart
CENTER
SCART_R
SCART_L
AMUTE
2301 100u
2303 100u
3310 470R
3312 470R
7322 BC817-25
7323 BC817-25
3311 2K7
3313 2K7
STEREO L/R
RIGHT
LEFT
1401-B YKC21-4105
STEREO_R_OUT
STEREO_L_OUT
FRONT_R
FRONT_L
2307 330n
2309 330n
3304 3K9
3309 3K9
7305-B OP 275
7305-A OP 275
+12VSTBY
3306 10R
2308 10u
6300 BAS316
4302 option
1300 DS2Y-S
SACD_BASEMGT
3307 27K
7320 BC817-25
12V2
2333 100u
2334 100u
3316 470R
3320 470R
7324 BC817-25
7325 BC817-25
3317 2K7
3321 2K7
FRONT_L/R
RIGHT
LEFT
1402-A YKC21-3866
FRONT_R_OUT
FRONT_L_OUT
I321 I322 I326
200mV / div AC 10ms / div
I328 I333 I337
200mV / div AC 10ms / div
SURROUND_R
SURROUND_L
7304-B NE5532
7304-A NE5532
2317 330n
2318 330n
3326 3K9
3333 3K9
7306-C HEF4053BT
7306-A HEF4053BT
7306-B HEF4053BT
7307-A NE5532
7307-B NE5532
2335 100u
2336 100u
3330 470R
3335 470R
7326 BC817-25
7327 BC817-25
3331 2K7
3336 2K7
SURROUND L/R
RIGHT
LEFT
1402-C YKC21-3866
SURROUND_R_OUT
SURROUND_L_OUT
BARE BOARD 3139 243 30412 01
V DC Vtg measured in STOP-MODE
CL 16532136_005.eps
061101

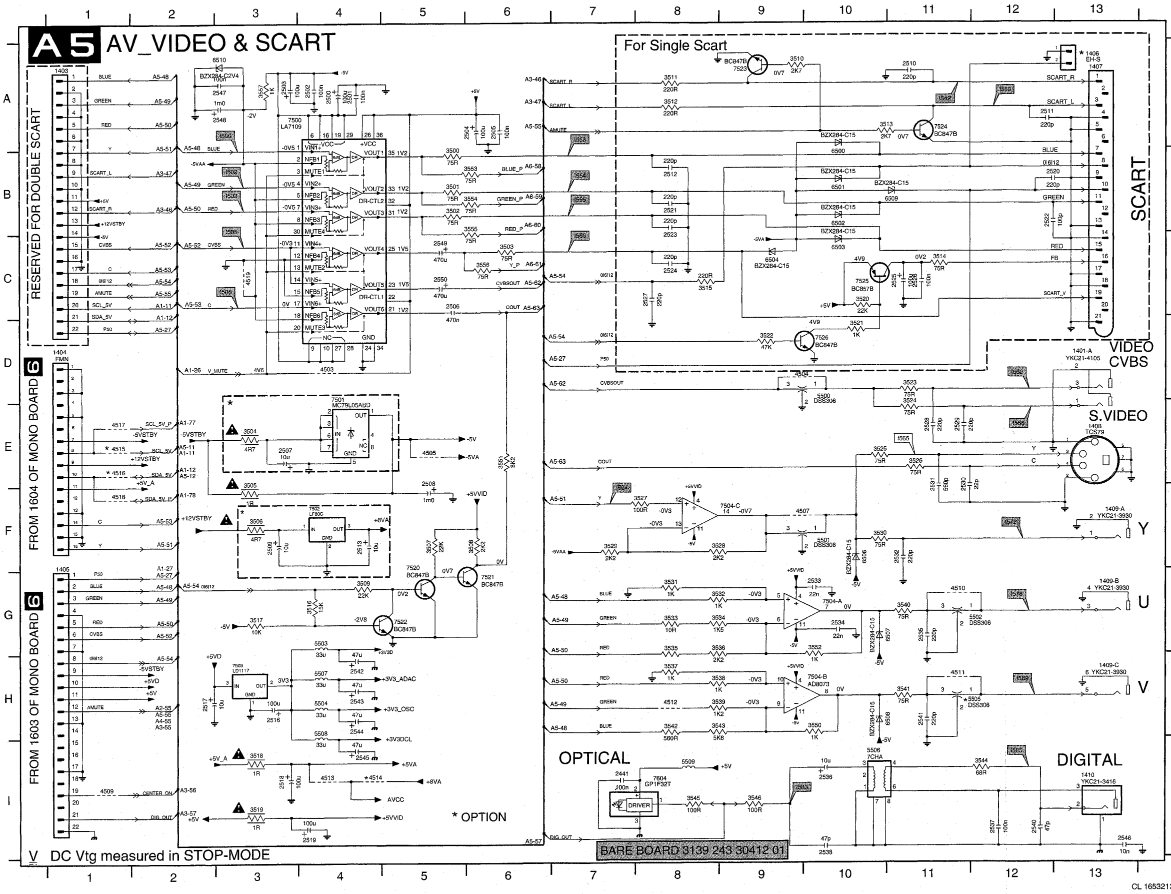
1300	E5
1401-B	B14
1402-A	E14
1402-C	H13
2300	A9
2301	A9
2302	B4
2303	C9
2304	C5
2305	C11
2306	D5
2307	C3
2308	D3
2309	F3
2310	C13
2311	C13
2312	D10
2313	F13
2314	F13
2315	F7
2316	G7
2317	G5
2318	H5
2319	I13
2320	I13
2321	C4
2332	A9
2333	D5
2334	F5
2335	H11
2336	I11
2337	H4
2338	I3
2339	H10
2340	G10
3300	A4
3301	A4
3304	D4
3306	D3
3307	E2
3309	G3
3310	A10
3311	B12
3312	C10
3313	C12
3314	C13
3315	C13
3316	E9
3317	E12
3320	F9
3321	F12
3322	F13
3323	F13
3326	G6
3330	H11
3331	H12
3333	H6
3335	I11
3336	I12
3337	I12
3338	I13
3341	B2
3342	B2
3345	B2
3346	C2
4300	A10
4301	C10
4302	E2
6300	E3
7300-A	B7
7300-B	A7
7300-C	B4
7302-A	A9
7302-B	C9
7303-A	B10
7303-B	D10
7304-A	H7
7304-B	F7
7305-A	F5
7305-B	C5
7306-A	H8
7306-B	H3
7306-C	G8
7307-A	G10
7307-B	I10
7320	E3
7321	A5
7322	A12
7323	C12
7324	E12
7325	F12
7326	H12
7327	I12

AV Board: Audio 2I

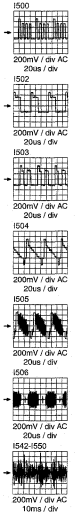

A4 AV_AUDIO 2
1 2 3 4 5 6 7 8 9 10 11 12 13 14
A B C D E F G H I
A2-41 FRONT_L
A2-40 FRONT_R
A2-45 SURROUND_L
A2-44 SURROUND_R
A2-42 CENTER
A1-25 SACD_BASEMGT
A2-43 LFE
A1-25 SACD_BASEMGT
A2-42 CENTER
3427 4K7
3428 100K
4400
3429 4K7
3430 100K
4401
3431 4K7
3432 100K
4402
3433 4K7
3434 100K
4403
3435 4K7
3436 100K
4404
7401-A NE5532
7401-B NE5532
7402-A NE5532
7402-B NE5532
7403-A NE5532
7403-B NE5532
7404-A NE5532
7404-B NE5532
7408-B LM833D
2400 100n
2401 100n
2402 100n
2403 100n
2404 100n
2405 100n
2406 100n
2407 100n
2409 100n
2412 100n
2413 220n
2414 100u
2415 100u
2416 100n
2417 100n
2408 330n
3400 4K7
3401 4K7
3402 4K7
3403 4K7
3404 4K7
3405 4K7
3407 3K9
3410 470R
3411 2K2
3413 4K7
3414 2K2
3415 470R
3412 2K7
3416 2K7
3417 10K
2411 100p
3418 10K
2410 100p
3422 10R
3426 10R
+5VA
-5VA
+5VA_H
-5VA_K
0V
0V7
7400-A HEF4053BT
7400-B HEF4053BT
7400-C HEF4053BT
Vdd Vss Vee
Y0 Y1 Z S E
7420 BC817-25
7421 BC817-25
1402-B YKC21-3866
LFE_OUT
CENTER_OUT
A5-55 AMUTE
I407
I410
200mV / div AC
10ms / div
200mV / div AC
10ms / div
C/LFE
SUB-WOOFER
CENTER
V DC Vtg measured in STOP-MODE
BARE BOARD 3139 243 30412 01
* OPTION
CL 16532136_006.eps
061101

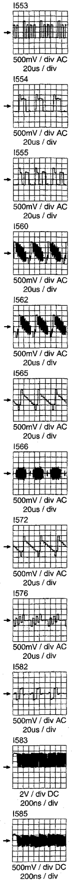
1402-B	H13
2400	A2
2401	B2
2402	C2
2403	D2
2404	E2
2405	F2
2406	E8
2407	F8
2408	H4
2409	C7
2410	I13
2411	I13
2412	D6
2413	G8
2414	E9
2415	H11
2416	H9
2417	I9
3400	B3
3401	C4
3402	D3
3403	E4
3404	F3
3405	G3
3407	I5
3410	E10
3411	G7
3412	G11
3413	F8
3414	G6
3415	H11
3416	I11
3417	I13
3418	I13
3422	C9
3426	C9
3427	B1
3428	B1
3429	B1
3430	C1
3431	C1
3432	D1
3433	D1
3434	E1
3435	E1
3436	F1
4400	B2
4401	C2
4402	D2
4403	E2
4404	F2
7400-A	F5
7400-B	C6
7400-C	H7
7401-A	B2
7401-B	B3
7402-A	C2
7402-B	D3
7403-A	E2
7403-B	F6
7404-A	H6
7404-B	E8
7408-B	H9
7420	G11
7421	I12

AV Board: Video & SCART


A5 AV_VIDEO & SCART
For Single Scart
SCART
RESERVED FOR DOUBLE SCART
FROM 1604 OF MONO BOARD 6
FROM 1603 OF MONO BOARD 6
7500 LA7109
7501 MC79L05ABD
7502 LF80C
7503 LD1117
7504-A
7504-B AD8073
7504-C
7604 GP1F32T
DRIVER
5506 7CHA
VIDEO CVBS
S.VIDEO
Y
U
V
OPTICAL
DIGITAL
* OPTION
BARE BOARD 3139 243 30412 01
V DC Vtg measured in STOP-MODE
1 2 3 4 5 6 7 8 9 10 11 12 13
A B C D E F G H I

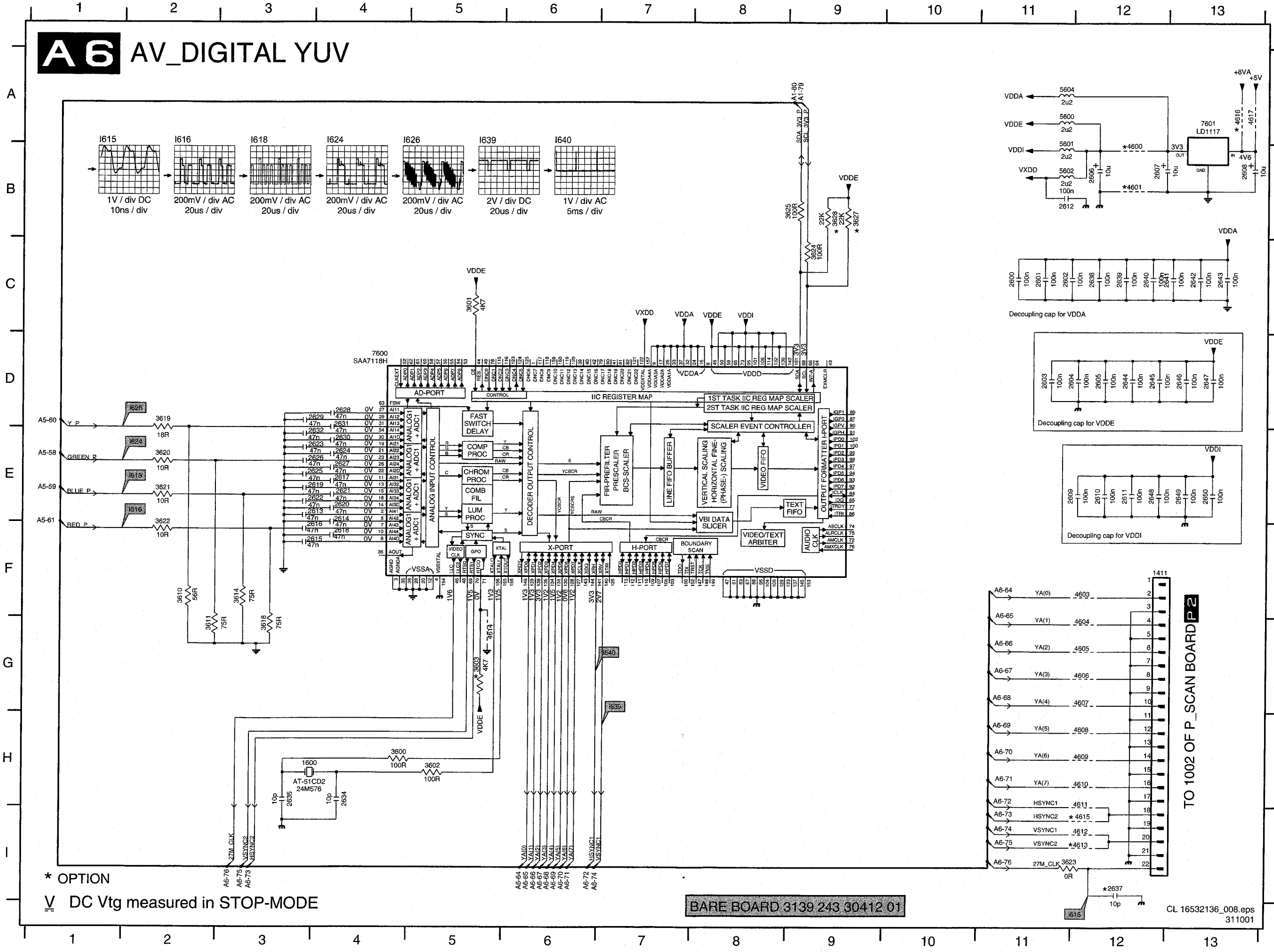
1401-A	D13
1403	A1
1404	D1
1405	F1
1406	A13
1407	A13
1408	E13
1409-A	F13
1409-B	G13
1409-C	H13
1410	I13
2441	I7
2500	A4
2501	A4
2502	A4
2503	A3
2504	A6
2505	A6
2506	C5
2507	E3
2508	E5
2509	F3
2510	A11
2511	A12
2512	B8
2513	F4
2516	H3
2517	H2
2518	I3
2519	I4
2520	B12
2521	B8
2522	B12
2523	B8
2524	C8
2525	C11
2526	C11
2527	C8
2528	E11
2529	E11
2530	F11
2531	F11
2532	F11
2533	G10
2534	G10
2535	G11
2536	I10
2537	I12
2538	I10
2540	I12
2541	H11
2542	H4
2543	H4
2544	H4
2545	I4
2546	I13
2547	A3
2548	A3
2549	C5
2550	C5
3500	B5
3501	B5
3502	B5
3503	C6
3504	E3
3505	F3
3506	F3
3507	F5
3508	F6
3509	G4
3510	A9
3511	A8
3512	A8
3513	A10
3514	C11
3515	C8
3516	G4
3517	G3
3518	I3
3519	I3
3520	C10
3521	D10
3522	D9
3523	D11
3524	E11
3525	E10
3526	E11
3527	F8
3528	F8
3529	F7
3530	F10
3531	G8
3532	G8
3533	G8
3534	G8
3535	G8
3536	G8
3537	H8
3538	H8
3539	H8
3540	G11
3541	H11
3542	H8
3543	H8
3544	I12
3545	I8
3546	I9
3550	H10
3551	E6
3552	G10
3553	B6
3554	B6
3555	B6
3556	C6
3557	A3
4503	D4
4504	D9
4505	E5
4507	F9
4509	I1
4510	G11
4511	H11
4512	H8
4513	I4
4514	I4
4515	E1
4516	E1
4517	E1
4518	F1
4519	C3
5500	D10
5501	F10
5502	G11
5503	G4
5504	H4
5505	H11
5506	I10
5507	H4
5508	H4
5509	I8
6500	B10
6501	B10
6502	B10
6503	C10
6504	C9
6506	F10
6507	G10
6508	H10
6509	B11
6510	A3
7500	A4
7501	D4
7502	F4
7503	H3
7504-A	G10
7504-B	H10
7504-C	F9
7520	F5
7521	G6
7522	G5
7523	A9
7524	A11
7525	C10
7526	D10
7604	I8





CL 16532136_007.eps
141101

AV Board: Digital YUV


A6 AV_DIGITAL YUV
I615 1V / div DC 10ns / div
I616 200mV / div AC 20us / div
I618 200mV / div AC 20us / div
I624 200mV / div AC 20us / div
I626 200mV / div AC 20us / div
I639 2V / div DC 20us / div
I640 1V / div AC 5ms / div
7600 SAA7118H
AD-PORT
CONTROL
IIC REGISTER MAP
1ST TASK IIC REG MAP SCALER
2ST TASK IIC REG MAP SCALER
SCALER EVENT CONTROLLER
FAST SWITCH DELAY
COMP PROC
CHROM PROC
COMB FIL
LUM PROC
SYNC
ANALOG INPUT CONTROL
DECODER OUTPUT CONTROL
FIR-PREFILTER PRESCALER BCS-SCALER
LINE FIFO BUFFER
VERTICAL SCALING HORIZONTAL FINE-(PHASE-) SCALING
VIDEO FIFO
OUTPUT FORMATTER I-PORT
TEXT FIFO
VBI DATA SLICER
VIDEO/TEXT ARBITER
AUDIO CLK
X-PORT
H-PORT
BOUNDARY SCAN
VSSA
VSSD
VDDA
VDDD
VDDE
VDDI
VXDD
A5-60 Y_P
A5-58 GREEN_P
A5-59 BLUE_P
A5-61 RED_P
3619 18R
3620 10R
3621 10R
3622 10R
3610 56R
3611 75R
3614 75R
3618 75R
3601 4K7
3603 4K7
3614
3625 100R
3624 100R
3628 22K
3627 22K
SDA_3V3_P
SCL_3V3_P
A1-80
A1-79
1600 AT-51CD2 24M576
2635 10p
2634 10p
3600 100R
3602 100R
27M_CLK
VSYNC2
HSYNC2
A6-76 A6-75 A6-73
A6-64 A6-65 A6-66 A6-67 A6-68 A6-69 A6-70 A6-71
A6-72 A6-74
YA(0) YA(1) YA(2) YA(3) YA(4) YA(5) YA(6) YA(7)
HSYNC1
VSYNC1
+8VA
+5V
7601 LD1117
5604 2u2
5600 2u2
5601 2u2
5602 2u2
2612 100n
2606 10u
2607 10u
2608 10u
*4600
*4601
*4616
4617
3V3
4V6
Decoupling cap for VDDA
Decoupling cap for VDDE
Decoupling cap for VDDI
1411
4603 4604 4605 4606 4607 4608 4609 4610
4611 *4615 4612 *4613
3623 0R
*2637 10p
TO 1002 OF P_SCAN BOARD P2
I615 I616 I618 I624 I626 I639 I640

* OPTION

V DC Vtg measured in STOP-MODE

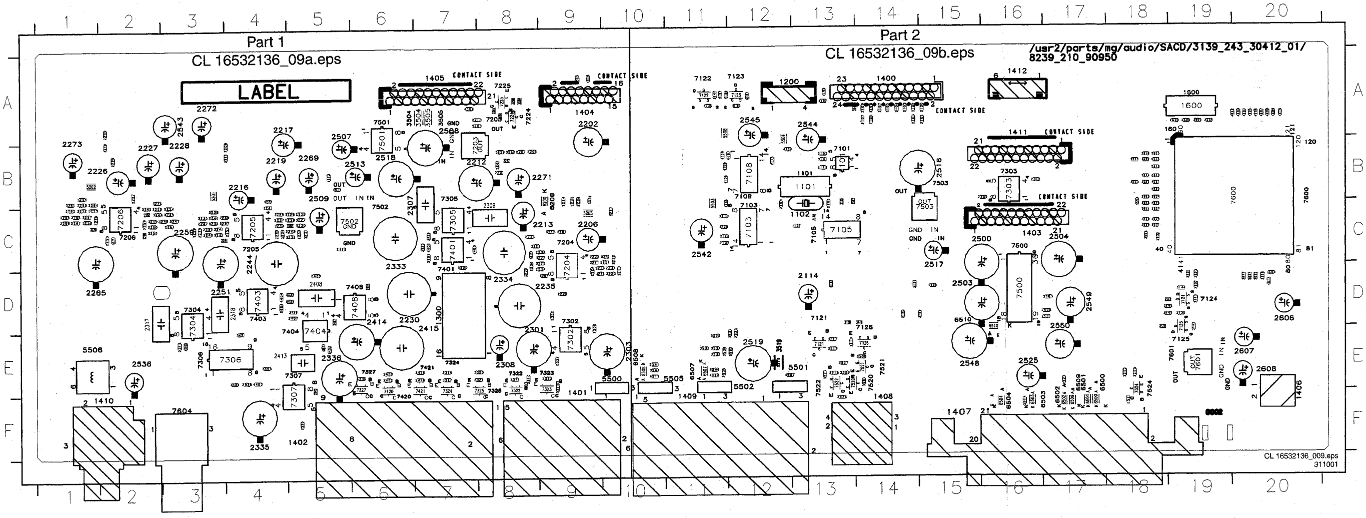
BARE BOARD 3139 243 30412 01

CL 16532136_008.eps
311001

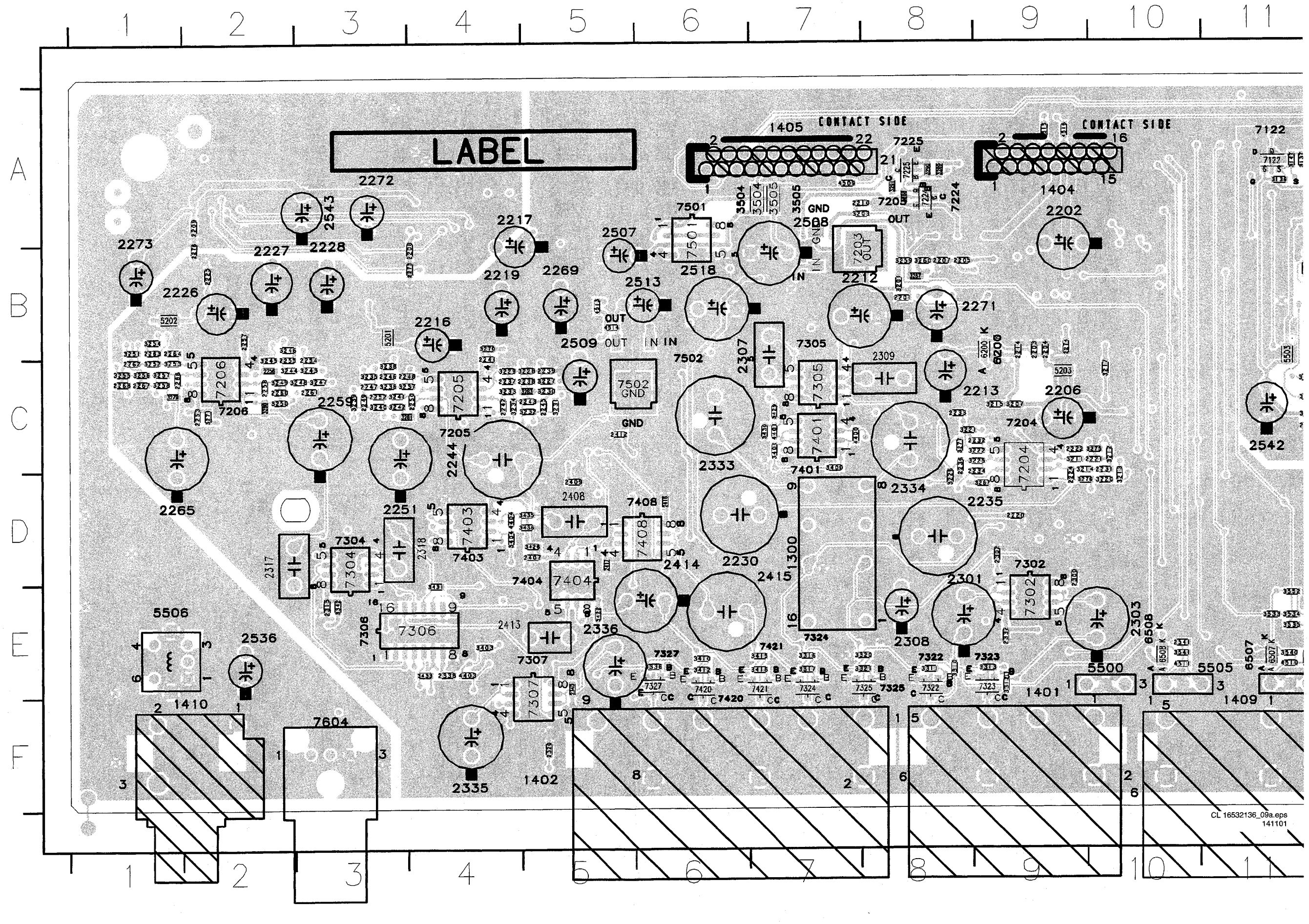
1411	F12
1600	H3
2600	C11
2601	C11
2602	C11
2603	D11
2604	D11
2605	D12
2606	B12
2607	B12
2608	B13
2609	E11
2610	E12
2611	E12
2612	B11
2613	E4
2614	E4
2615	F4
2616	E4
2617	E4
2618	F4
2619	E4
2620	E4
2621	E4
2622	E4
2623	E4
2624	E4
2625	E4
2626	E4
2627	E4
2628	D4
2629	D4
2630	E4
2631	D4
2632	E4
2634	H4
2635	H3
2637	I12
2638	C12
2639	C12
2640	C12
2641	C12
2642	C13
2643	C13
2644	D12
2645	D12
2646	D13
2647	D13
2648	E12
2649	E13
2650	E13
3600	H4
3601	C5
3602	H5
3603	G5
3610	F2
3611	G2
3614	F3
3618	G3
3619	D2
3620	E2
3621	E2
3622	F2
3623	I11
3624	C9
3625	B8
3627	B9
3628	B9
4600	B12
4601	B12
4603	F12
4604	G12
4605	G12
4606	G12
4607	G12
4608	H12
4609	H12
4610	H12
4611	H12
4612	I12
4613	I12
4614	G5
4615	I12
4616	A13
4617	A13
5600	A11
5601	B11
5602	B11
5604	A11
7600	D4
7601	A13

Layout AV Board: (Overview Top Side)

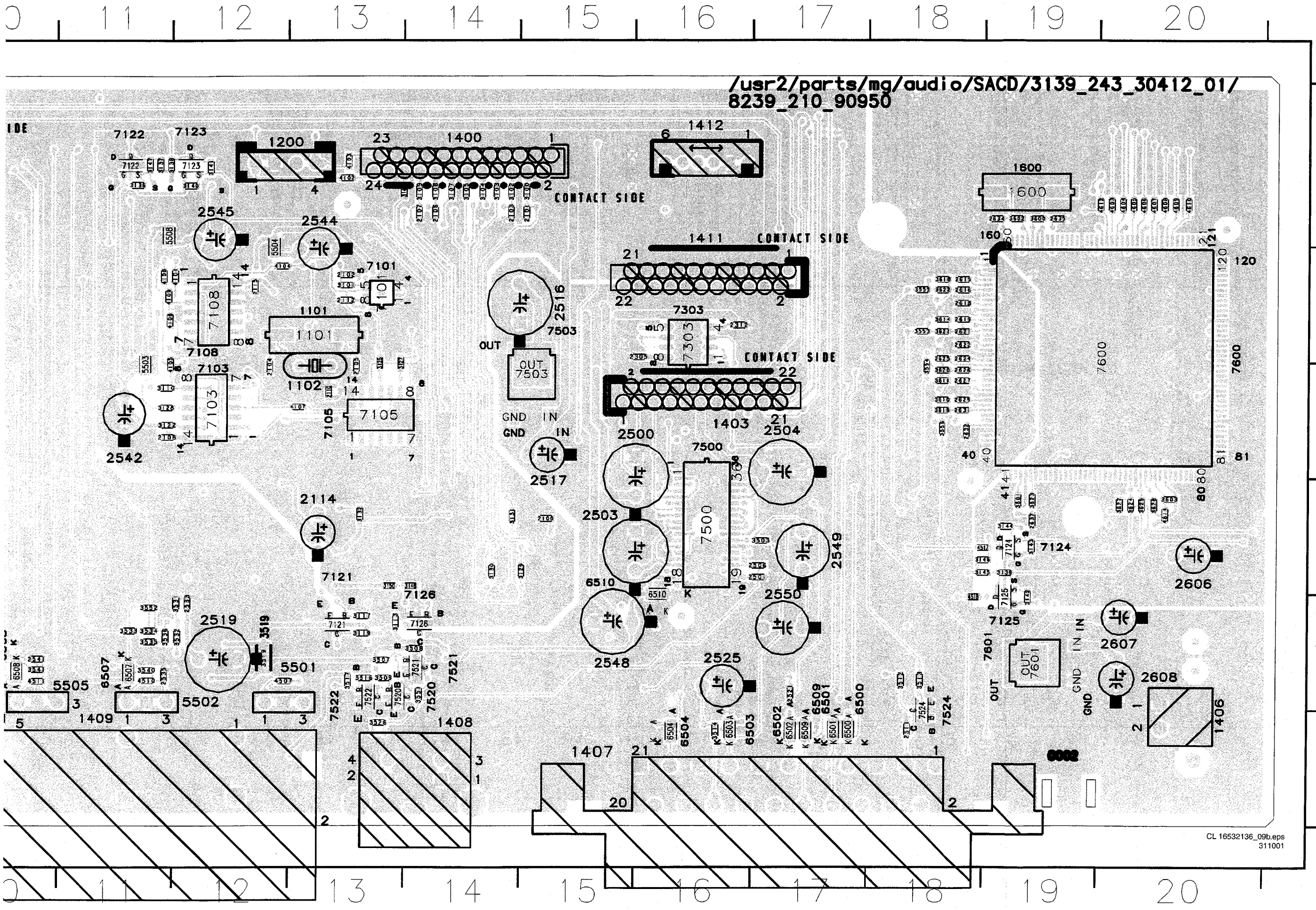
1101	B13
1102	C13
1200	A12
1300	D7
1400	A14
1401	E9
1402	F5
1403	C16
1404	A9
1405	A7
1406	F20
1407	F15
1408	F14
1409	F11
1410	F2
1411	A16
1412	A16
1600	A19
2100	D15
2101	A15
2102	B13
2103	A14
2104	C12
2105	C13
2106	A14
2107	A14
2108	C11
2110	C13
2112	B13
2114	D13
2115	B12
2201	B8
2202	A9
2203	B9
2204	B9
2205	B8
2206	C9
2207	B8
2208	B4
2209	A2
2210	A8
2212	B7
2213	C9
2214	B9
2216	B4
2217	A4
2219	B4
2220	D9
2221	C10
2222	C9
2224	D9
2225	B2
2226	B1
2227	B2
2228	B3
2230	D6
2231	D10
2232	C9
2233	C8
2234	D9
2235	D9
2236	C8
2237	C4
2238	C5
2239	C5
2241	C4
2242	C4
2243	C5
2244	C4
2245	C5
2246	C3
2247	C3
2248	C3
2249	C3
2250	C4
2251	D3
2252	C3
2253	C2
2254	C3
2255	C2
2256	C2
2257	B2
2258	C2
2259	C3
2260	C2
2261	C3
2262	C1
2263	B1
2264	B1
2265	D1
2266	C1
2267	C1
2268	C1
2269	B5
2271	B9
2272	A3
2273	A1
2274	B9
2275	B4
2276	B2
2300	D9
2301	D8
2302	D9
2303	E10
2305	B16
2307	B6
2308	E8
2309	C8
2312	B16
2315	E3
2317	D2
2318	D4
2320	F5
2332	E9
2333	C6
2334	D8
2335	F4
2336	E5
2338	E4
2340	E5
2407	D5
2408	D5
2409	D5
2412	C5
2413	E4
2414	D6
2415	D7
2416	D6
2417	D5
2500	C16
2501	D17
2503	D15
2504	C17
2506	D17
2507	A5
2508	A7
2509	B5
2511	F18
2513	B6
2516	B15
2517	D15
2518	B6
2519	E12
2521	E17
2525	E16
2533	E12
2535	E11
2536	E2
2541	E10
2542	C11
2543	A3
2544	A13
2545	A12
2548	E15
2549	D17
2550	E17
2606	D20
2607	E20
2608	E20
2615	B18
2616	B18
2618	B18
2619	B18
2621	B18
2622	B18
2624	B18
2625	B18
2626	C18
2627	C18
2629	C18
2631	C18
2632	C18
2634	A19
2635	A19
2637	D19
3100	A15
3101	B13
3102	A14
3103	A14
3104	A14
3105	A14
3107	A14
3108	A14
3109	A14
3110	C11
3113	E13
3117	E13
3119	E13
3122	C11
3125	C13
3127	C13
3128	C11
3129	D15
3130	D14
3131	D14
3132	D13
3136	A11
3137	A11
3138	A11
3139	D19
3140	A12
3141	A12
3142	E19
3143	D19
3144	D19
3145	D18
3146	D18
3147	A11
3148	D14
3149	A13
3150	D13
3201	B8
3203	A8
3207	C9
3211	C9
3212	C10
3213	D10
3214	D9
3215	C9
3217	C10
3220	D10
3221	C8
3222	C9
3225	C9
3226	D8
3227	C5
3228	C5
3229	C4
3230	C5
3231	C5
3232	C5
3233	C4
3234	C4
3235	C3
3236	C3
3237	C3
3238	C3
3239	C3
3240	C3
3241	C3
3242	C3
3243	C3
3244	C2
3245	C2
3246	B2
3247	C3
3248	C3
3249	C2
3250	C2
3251	B1
3252	C1
3253	C1
3254	B1
3255	C1
3256	C1
3257	C1
3258	C1
3259	B8
3260	B8
3267	D9
3270	B4
3271	C2
3275	C10
3276	D9
3277	C8
3279	C1
3280	C2
3281	C3
3283	C5
3287	B8
3288	A8
3289	A8
3290	A8
3291	A8
3310	E8
3311	E8
3312	E9
3313	E9
3316	E7
3317	E7
3320	E8
3321	E8
3336	E6
3342	E3
3400	C7
3401	C7
3403	E4
3404	D4
3410	E6
3412	E6
3415	E7
3416	E7
3422	E5
3426	D5
3429	C7
3430	C7
3431	E4
3433	E4
3435	D5
3436	D5
3503	D17
3504	A7
3505	A7
3507	E13
3508	E14
3509	E13
3512	E18
3513	E18
3514	F16
3516	E13
3517	E13
3519	E12
3526	F13
3531	E12
3532	E12
3533	E11
3534	E11
3535	E11
3536	E11
3540	E11
3541	E10
3551	E14
3552	E11
3553	B18
3554	C18
3555	B18
3556	C18
3600	A19
3601	D19
3602	A19
3603	D20
3610	C18
3611	C18
3614	B18
3618	B18
3619	C18
3620	C18
3621	B18
3622	B18
3623	D19
3624	D20
3625	D20
3627	D20
3628	D20
4101	B12
4102	A13
4103	A13
4104	B12
4105	C11
4106	B11
4107	C13
4108	B11
4109	B11
4400	C7
4401	C7
4403	E4
4404	D4
4507	E12
4509	A7
4510	E11
4511	E10
4513	B5
4514	B5
4515	A9
4516	A9
4517	D18
4518	E18
4603	A20
4604	A20
4605	A20
4606	A20
4607	A20
4608	A20
4609	A20
4610	A20
4612	A20
4614	D20
5201	B3
5202	B1
5203	C9
5500	E10
5501	E13
5502	E12
5503	C11
5504	B12
5505	E11
5506	E1
5508	A11
6200	B9
6500	F17
6501	F17
6502	F17
6503	F16
6504	F16
6507	E11
6508	E10
6509	F17
6510	E16
7101	B13
7103	C12
7105	C13
7108	B12
7121	E13
7122	A11
7123	A12
7124	D19
7125	E19
7126	E14
7203	B7
7204	C9
7205	C4
7206	C2
7224	A8
7225	A8
7302	E9
7303	B16
7304	D3
7305	C7
7306	E4
7307	F5
7322	E8
7323	E9
7324	E7
7325	E8
7327	E6
7401	C7
7403	D4
7404	D5
7408	D6
7420	E6
7421	E7
7500	D16
7501	A6
7502	C5
7503	C15
7520	E13
7521	E14
7522	E13
7524	F18
7600	B20
7601	E19
7604	F3



Layout AV Board: (Part 1 Top Side)

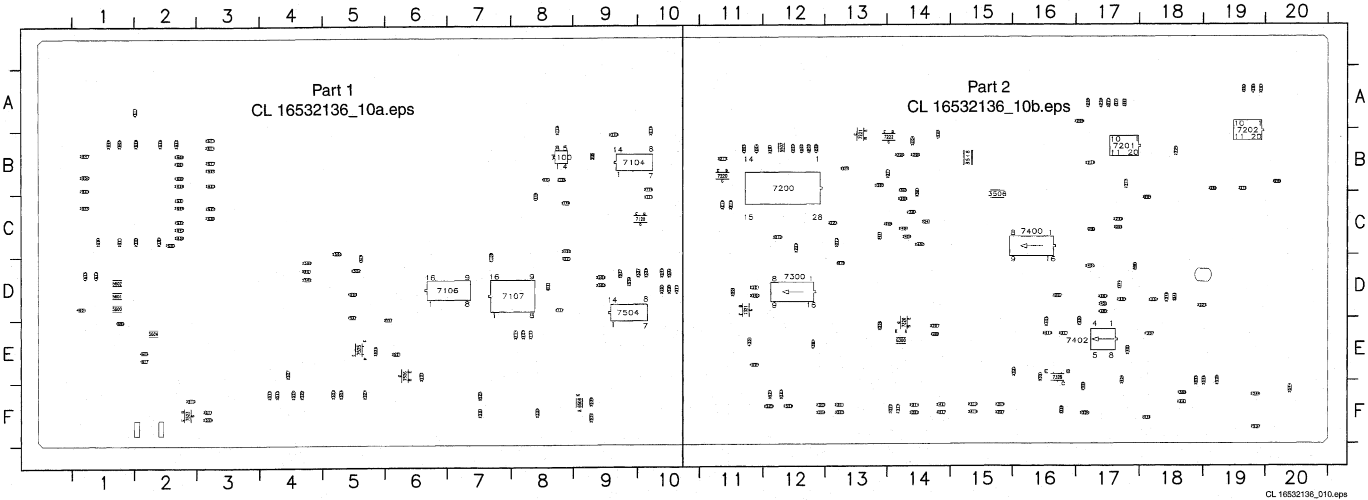

1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
LABEL
CONTACT SIDE
1405
1404
7122
7225
7224
7205
7203
OUT
GND
IN
3504
3505
7501
2508
2518
2272
2543
2228
2227
2273
2226
2217
2219
2269
2507
2513
2202
2212
2271
2216
2509
OUT
IN
7502
GND
2307
7305
2309
2213
2206
6200
5203
7206
7205
2259
2244
2333
7401
2334
7204
2542
2265
2251
7403
2408
7408
2230
1300
2235
7302
7304
2317
2318
7404
2414
2415
2301
2308
2303
6508
6507
5506
7306
2413
2336
7324
7421
7327
7322
7323
7420
7325
5500
5505
1401
1409
2536
1410
7604
7307
2335
1402
CL 16532136_09a.eps
141101

Layout AV Board: (Part 2 Top Side)


/usr2/parts/mg/audio/SACD/3139_243_30412_01/
8239_210_90950
10
11
12
13
14
15
16
17
18
19
20
A
B
C
D
E
F
7122
7123
1200
1400
1412
1600
CONTACT SIDE
1411
7600
2545
2544
7101
7108
1101
1102
7103
7105
2542
2516
7503
OUT
GND
IN
7303
1403
2500
2504
2517
7500
2114
2503
2549
2606
7124
7121
7126
6510
2550
7125
2607
2519
3519
5501
2548
2525
7601
2608
1406
5505
1409
5502
6507
7522
7520
7521
1408
1407
6504
6503
6502
6509
6501
6500
7524
CL 16532136_09b.eps
311001

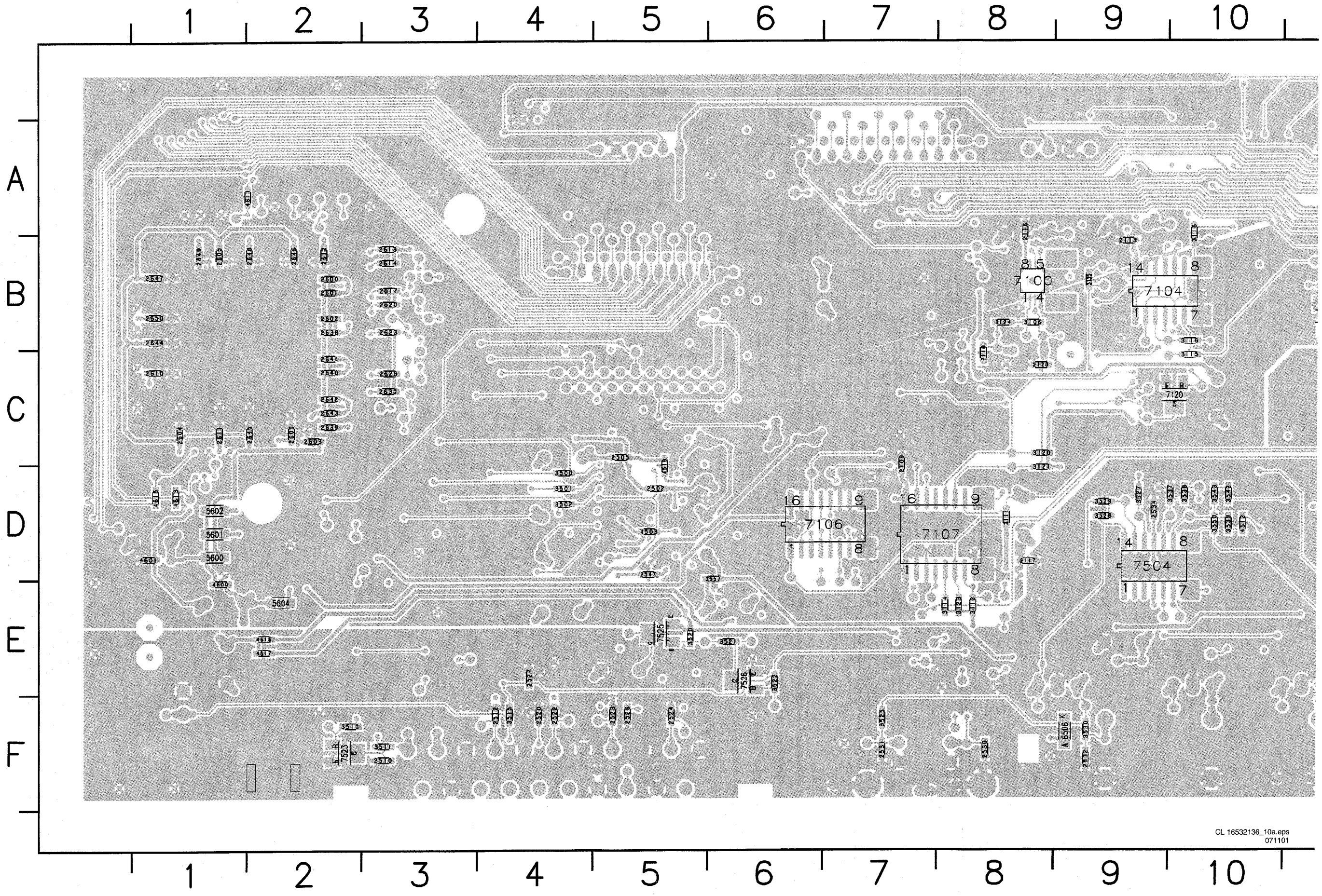
Layout AV Board: (Overview Bottom Side)

2109	D7	2314	F14	2512	F4	2601	B2	2641	C2	3123	E8	3272	B19	3330	F17	3432	D17	3530	F9	4300	E12	5601	D1	7326	E16
2113	B9	2316	D18	2520	F4	2602	B2	2642	C2	3124	B8	3273	A17	3331	E16	3434	E17	3537	D10	4301	E11	5602	D1	7400	C16
2116	A8	2319	F15	2522	F4	2603	C2	2643	C2	3135	B9	3274	A17	3333	D18	3500	D4	3538	D10	4302	E14	5604	E2	7402	E17
2117	D8	2321	D11	2523	F5	2604	C1	2644	B1	3200	B14	3278	D13	3335	E16	3501	D4	3539	D10	4402	D17	6300	E14	7504	D9
2118	C8	2337	E18	2524	F5	2605	B1	2645	C2	3204	B14	3282	C17	3337	F15	3502	D4	3542	D10	4503	D5	6506	F9	7523	F2
2120	C8	2339	F17	2526	F5	2609	C2	2646	B2	3205	B12	3284	C18	3338	F16	3506	C15	3543	D10	4504	E11	7100	B8	7525	E5
2200	B14	2400	C14	2527	E4	2610	C1	2647	B1	3208	A17	3285	B19	3341	C14	3510	F2	3544	F20	4505	B14	7104	B9	7526	E6
2211	B14	2401	C14	2528	F12	2611	C1	2648	B2	3209	A19	3286	B20	3345	B14	3511	F3	3545	F18	4512	D10	7106	D7		
2215	B17	2402	E17	2529	F12	2612	B2	2649	B1	3210	C12	3300	D11	3346	D18	3515	F4	3546	F19	4519	D5	7107	D8		
2218	B17	2403	E17	2530	F8	2613	B3	2650	B1	3216	B11	3301	D11	3402	D17	3518	B15	3550	D10	4600	E1	7120	C10		
2223	C12	2404	D17	2531	F7	2614	B3	3106	B8	3218	C11	3304	C14	3405	D17	3520	E5	3557	E6	4601	D1	7200	B12		
2229	B18	2405	D17	2532	F9	2617	B3	3111	D8	3219	C11	3306	E13	3407	D16	3521	E6	4200	B12	4611	A2	7201	B17		
2240	C17	2406	E16	2534	D9	2620	B3	3112	E8	3223	C13	3307	E14	3411	E16	3522	E6	4202	B12	4613	D1	7202	B19		
2270	B13	2410	F15	2537	F19	2623	B3	3114	E8	3224	C13	3309	B13	3413	E16	3523	F12	4203	B12	4615	D1	7220	B11		
2304	C14	2411	F14	2538	E19	2628	C3	3115	C10	3261	B12	3314	F12	3414	D17	3524	F12	4204	B11	4616	E2	7221	B13		
2306	C14	2441	F18	2540	F19	2630	C3	3116	B10	3262	A17	3315	F13	3417	F14	3525	F7	4205	B11	4617	E2	7222	B14		
2310	F12	2502	D5	2546	F18	2638	B2	3118	B10	3263	A19	3322	F14	3418	F15	3527	D9	4206	A19	5507	B12	7300	D12		
2311	F13	2505	C5	2547	D5	2639	C2	3120	C8	3268	C14	3323	F14	3427	C13	3528	D9	4208	A17	5509	F18	7320	E14		
2313	F14	2510	F3	2600	B2	2640	C2	3121	D8	3269	C17	3326	D18	3428	C14	3529	D9	4209	A17	5600	D1	7321	D11		



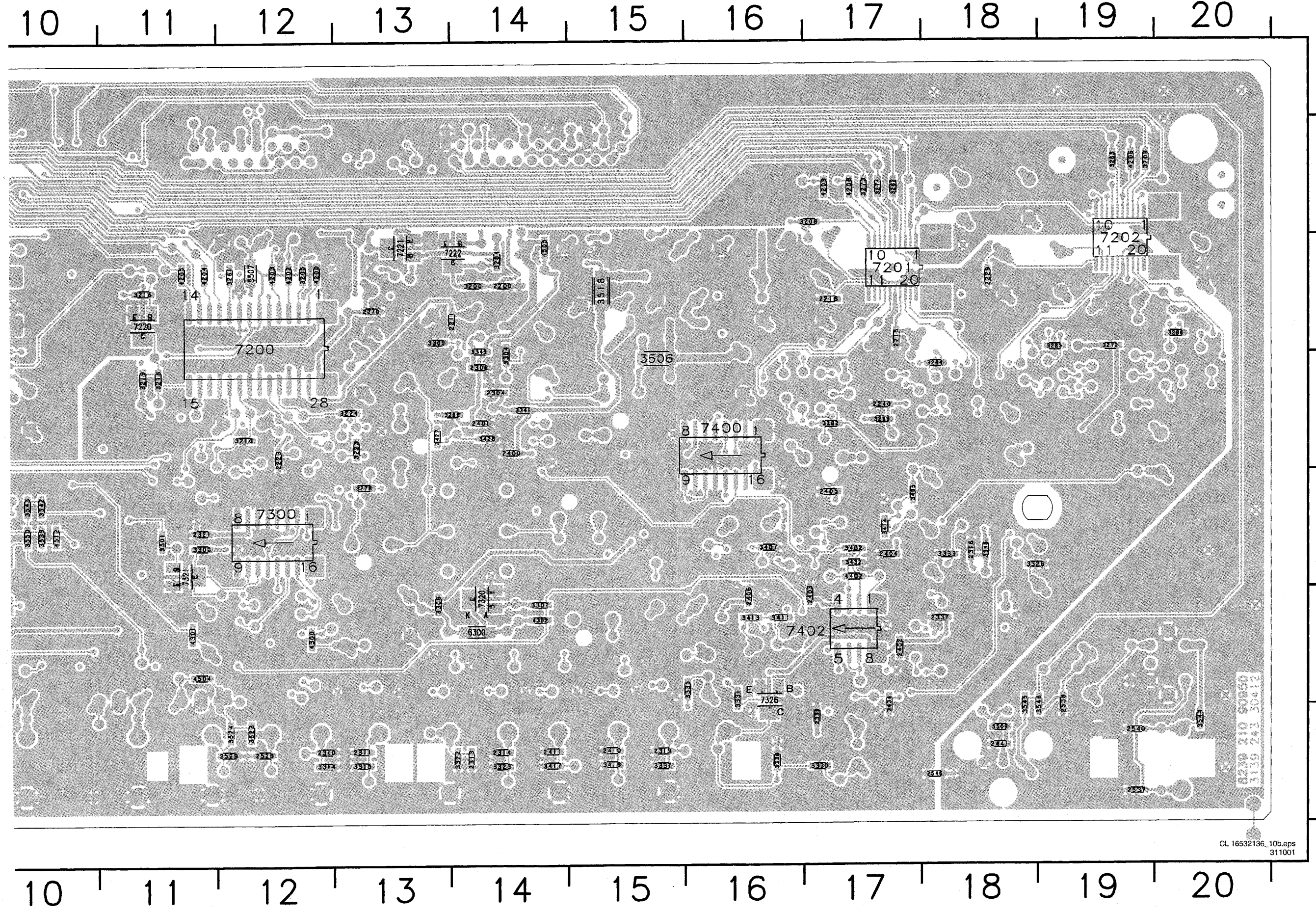
CL 16532136_010.eps
311001

Layout AV Board: (Part 1 Bottom Side)


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
7100
7104
7106
7107
7504
7120
7523
7525
7526
5600
5601
5602
5604
6506
16
9
1
8
14
7

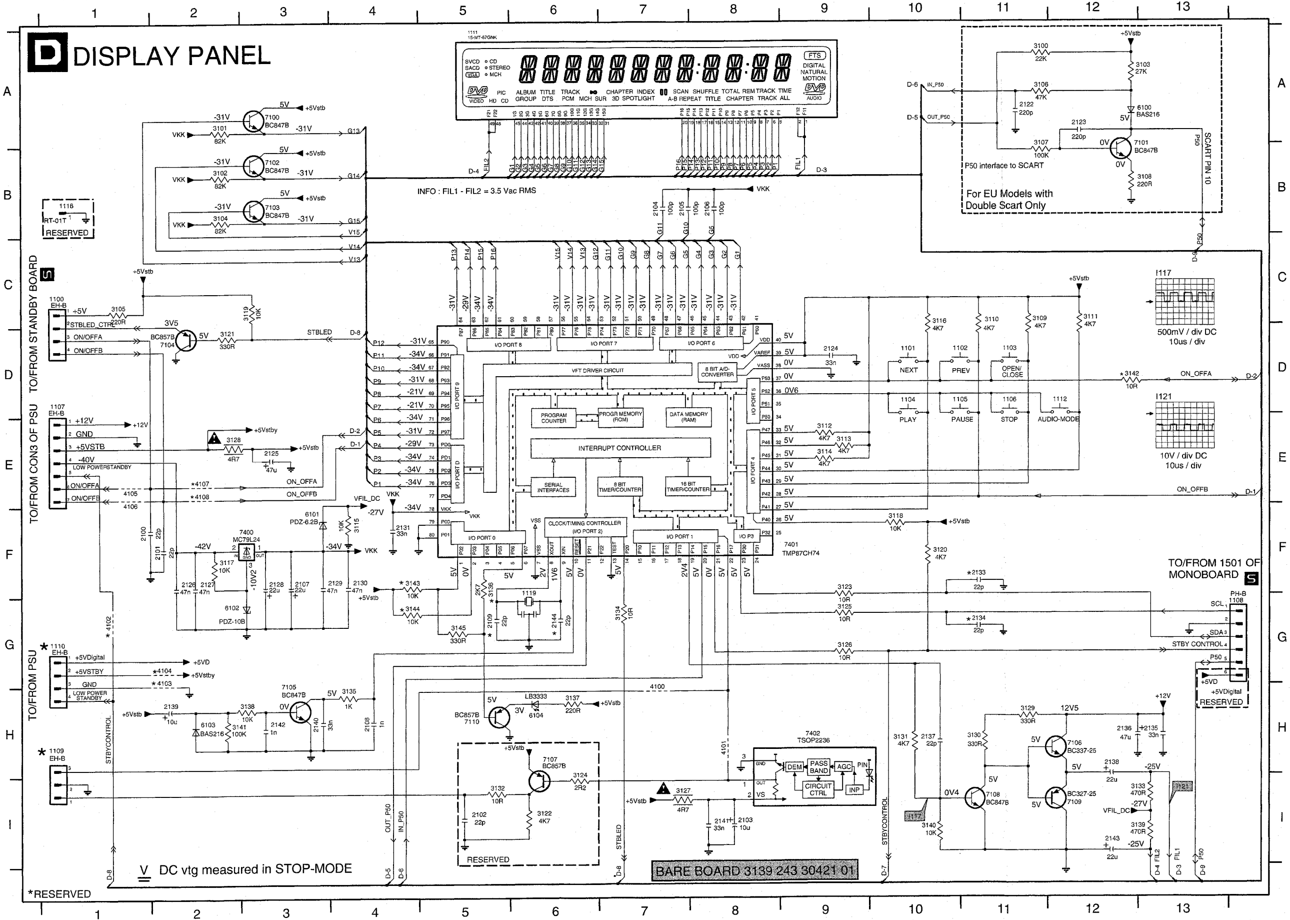
CL 16532136_10a.eps
071101

Layout AV Board: (Part 2 Bottom Side)


10
11
12
13
14
15
16
17
18
19
20
A
B
C
D
E
F
7200
14
1
15
28
7220
7221
7222
3518
3506
7201
10
1
11
20
7202
10
1
11
20
7400
8
1
9
16
7300
8
1
9
16
7320
6300
7402
4
1
5
8
7326
E
B
C
8239 210 90950
3139 243 30412

CL 16532136_10b.eps
311001

Display Panel

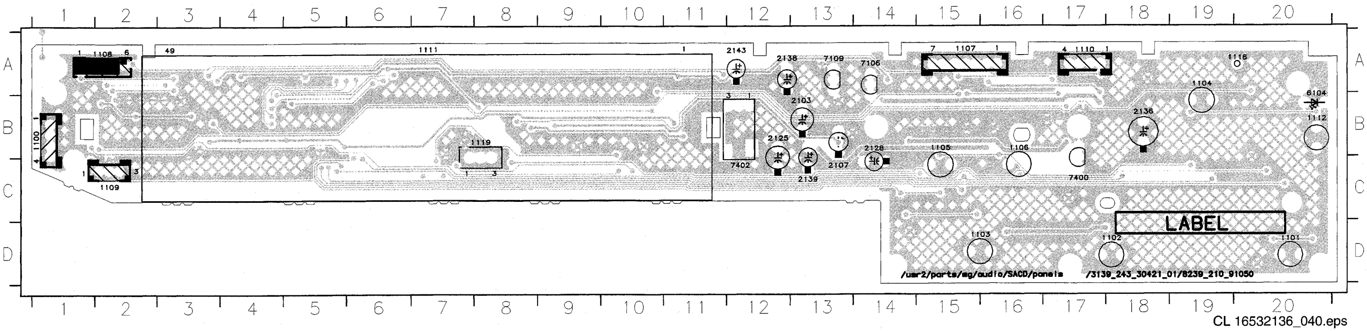

D DISPLAY PANEL
1111 15-MT-67GNK
SVCD CD SACD STEREO VCD MCH
FTS DIGITAL NATURAL MOTION
PIC ALBUM TITLE TRACK CHAPTER INDEX SCAN SHUFFLE TOTAL REM TRACK TIME
VIDEO HD CD GROUP DTS PCM MCH SUR 3D SPOTLIGHT A-B REPEAT TITLE CHAPTER TRACK ALL AUDIO
INFO : FIL1 - FIL2 = 3.5 Vac RMS
7100 BC847B
7102 BC847B
7103 BC847B
7104 BC857B
7105 BC847B
7106 BC337-25
7107 BC857B
7108 BC847B
7109 BC327-25
7110 BC857B
7101 BC847B
7400 MC79L24
7401 TMP87CH74
7402 TSOP2236
6100 BAS216
6101 PDZ-6.2B
6102 PDZ-10B
6103 BAS216
6104 LB3333
1116 RT-01T RESERVED
1100 EH-B
1107 EH-B
1110 EH-B
1109 EH-B
1108 PH-B
TO/FROM STANDBY BOARD
TO/FROM CON3 OF PSU
TO/FROM PSU
TO/FROM 1501 OF MONOBOARD
+5V STBLED_CTRL ON/OFFA ON/OFFB
+12V GND +5VSTB -40V LOW POWERSTANDBY ON/OFFA ON/OFFB
+5VDigital +5VSTBY GND LOW POWER STANDBY
SCL SDA STBY CONTROL P50
+5VD +5VDigital RESERVED
P50 interface to SCART
For EU Models with Double Scart Only
SCART PIN 10
I/O PORT 8 I/O PORT 7 I/O PORT 6 I/O PORT 9 I/O PORT D I/O PORT 5 I/O PORT 4 I/O PORT 0 I/O PORT 1 I/O P3
VFT DRIVER CIRCUIT
8 BIT A/D-CONVERTER
PROGRAM COUNTER
PROGR MEMORY (ROM)
DATA MEMORY (RAM)
INTERRUPT CONTROLLER
SERIAL INTERFACES
8 BIT TIMER/COUNTER
16 BIT TIMER/COUNTER
CLOCK/TIMING CONTROLLER (I/O PORT 2)
1101 NEXT
1102 PREV
1103 OPEN/CLOSE
1104 PLAY
1105 PAUSE
1106 STOP
1112 AUDIO-MODE
I117 500mV / div DC 10us / div
I121 10V / div DC 10us / div
DEM PASS BAND AGC PIN CIRCUIT CTRL INP
RESERVED
V DC vtg measured in STOP-MODE
BARE BOARD 3139 243 30421 01
*RESERVED

CL 16532136_013.eps
311001

1100	C1
1101	D10
1102	D10
1103	D11
1104	D10
1105	D10
1106	D11
1107	D1
1108	G13
1109	H1
1110	G1
1111	A5
1112	D12
1116	B1
1119	F6
2100	F1
2101	F2
2102	I5
2103	I8
2104	B7
2105	B7
2106	B8
2107	F3
2108	H4
2109	G5
2122	A11
2123	A12
2124	D9
2125	E3
2126	F2
2127	F2
2128	F3
2129	F4
2130	F4
2131	F4
2133	F11
2134	G11
2135	H13
2136	H12
2137	H10
2138	H12
2139	H2
2140	H3
2141	I8
2142	H3
2143	I12
2144	G6
3100	A11
3101	A2
3102	B2
3103	A13
3104	B2
3105	C1
3106	A11
3107	B11
3108	B13
3109	C11
3110	C11
3111	C12
3112	E9
3113	E9
3114	E9
3115	F4
3116	C10
3117	F2
3118	F10
3119	C3
3120	F10
3121	D2
3122	I6
3123	F9
3124	I6
3125	G9
3126	G9
3127	I7
3128	E2
3129	H11
3130	H11
3131	H10
3132	I5
3133	I12
3134	G7
3135	H4
3136	F5
3137	H6
3138	H3
3139	I12
3140	I10
3141	H2
3142	D12
3143	F4
3144	G4
3145	G5
4100	H7
4101	H8
4102	G1
4103	G2
4104	G2
4105	E1
4106	E1
4107	E2
4108	E2
6100	A13
6101	F3
6102	G2
6103	H2
6104	H6
7100	A3
7101	B12
7102	B3
7103	B3
7104	D2
7105	H3
7106	H12
7107	H6
7108	I11
7109	I12
7110	H5
7400	F3
7401	F9
7402	H9

Layout Display Panel (Top Side)

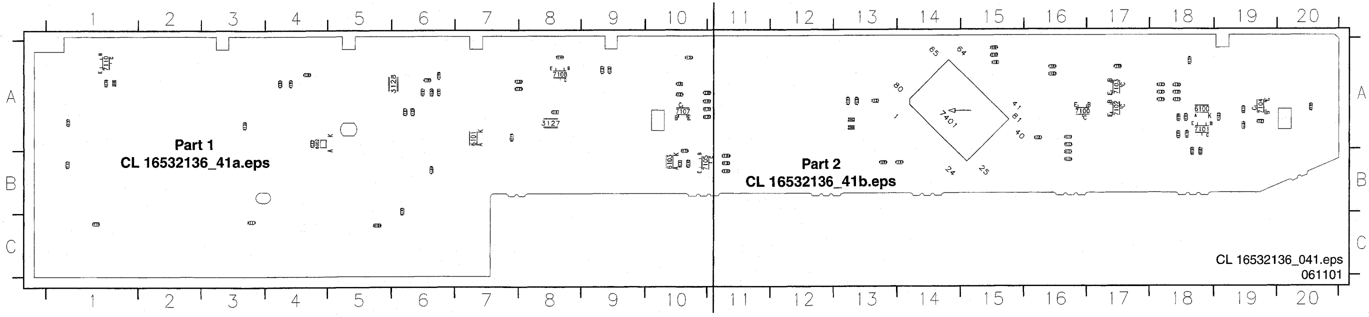
1100	B1
1101	D20
1102	D18
1103	D15
1104	A19
1105	B15
1106	B16
1107	A15
1108	A2
1109	C2
1110	A17
1111	A7
1112	B20
1116	A20
1119	B8
2103	B13
2107	C13
2125	B12
2128	B14
2136	B18
2138	A12
2139	C13
2143	A12
6104	B20
7106	A14
7109	A13
7400	C17
7402	C12


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
A
B
C
D
1108
1111
49
1100
1109
1119
2143
2138
7109
7106
1107
1110
1116
1104
6104
1112
2103
2136
2125
2139
2107
2128
1105
1106
7400
7402
LABEL
1103
1102
1101
/usr2/parts/mg/audio/SACD/panels
/3139_243_30421_01/8239_210_91050

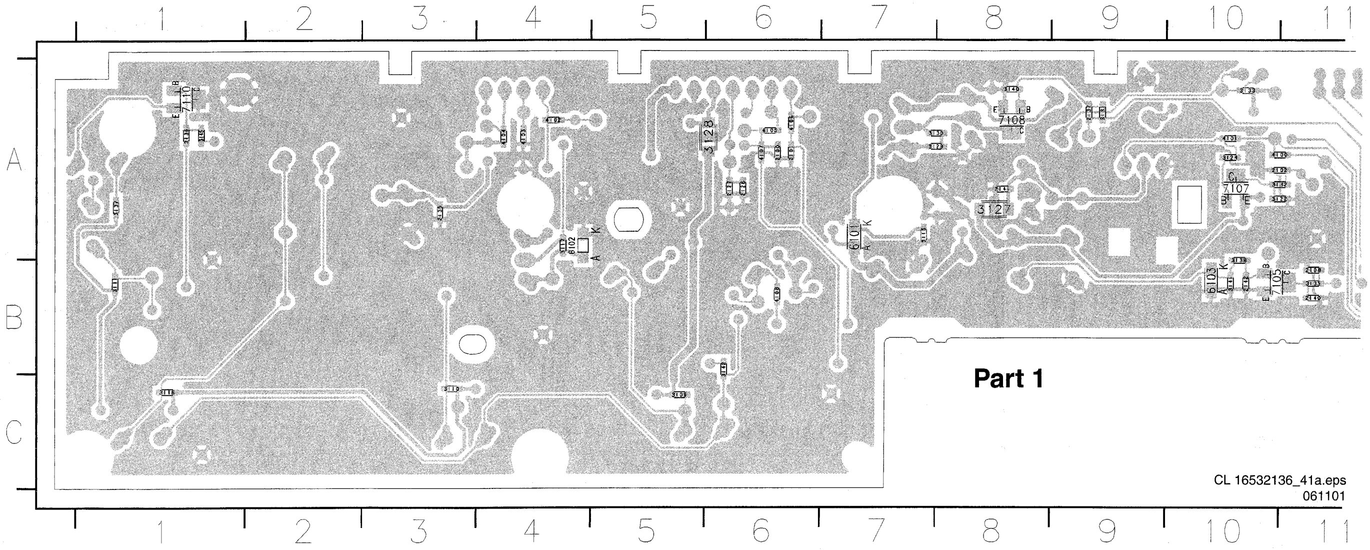
CL 16532136_040.eps
061101

Layout Display Panel (Overview Bottom Side)

2100	A6
2101	A6
2102	A10
2104	A16
2105	A16
2106	A17
2108	B11
2109	B13
2122	A18
2123	A19
2124	A16
2126	A6
2127	A6
2129	A13
2130	A13
2131	A13
2133	A18
2134	A18
2135	A3
2137	A9
2140	B11
2141	A8
2142	B10
2144	B14
3100	B18
3101	A15
3102	A15
3103	A18
3104	A15
3105	A20
3106	A18
3107	B18
3108	A18
3109	C5
3110	C3
3111	B1
3112	A16
3113	A16
3114	B16
3115	A7
3116	C1
3117	A4
3118	B16
3119	A19
3120	A18
3121	A19
3122	A10
3123	A18
3124	A10
3125	A18
3126	A18
3127	A8
3128	A6
3129	A7
3130	A7
3131	A9
3132	A10
3133	A10
3134	A19
3135	B11
3136	A1
3137	A1
3138	B10
3139	A18
3140	A8
3141	B10
3142	B6
3143	A13
3144	A13
3145	A1
4100	A10
4101	A10
4102	A4
4103	A4
4104	A4
4105	A6
4106	A6
4107	A6
4108	B6
6100	A18
6101	A7
6102	A4
6103	B10
7100	A16
7101	A18
7102	A17
7103	A17
7104	A19
7105	B10
7107	A10
7108	A8
7110	A1
7401	A14

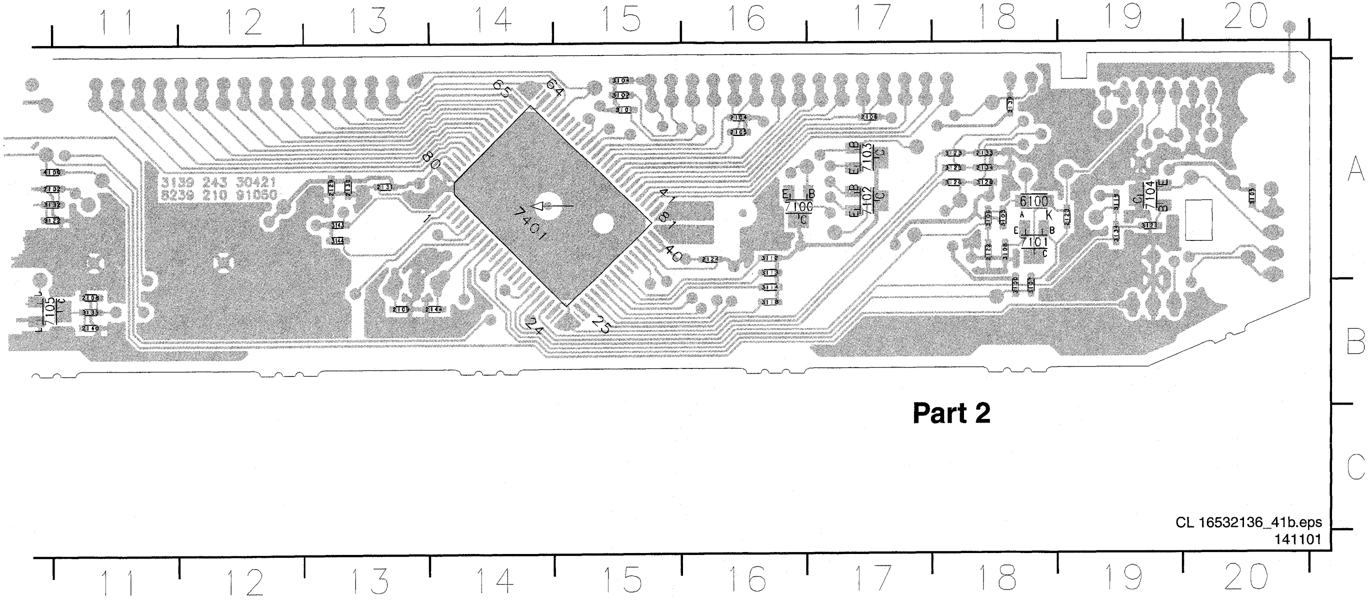

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
A
B
C
Part 1
CL 16532136_41a.eps
Part 2
CL 16532136_41b.eps
7110
7108
3128
3127
7107
6101
6103
7105
7401
65
64
80
41
81
40
24
25
1
7100
7103
7102
6100
7101
7104
CL 16532136_041.eps
061101

Layout Display Panel (Part 1 Bottom Side)


1
2
3
4
5
6
7
8
9
10
11
A
B
C
7110
6102
3128
7108
6101
3127
7107
6103
7105
Part 1

CL 16532136_41a.eps
061101

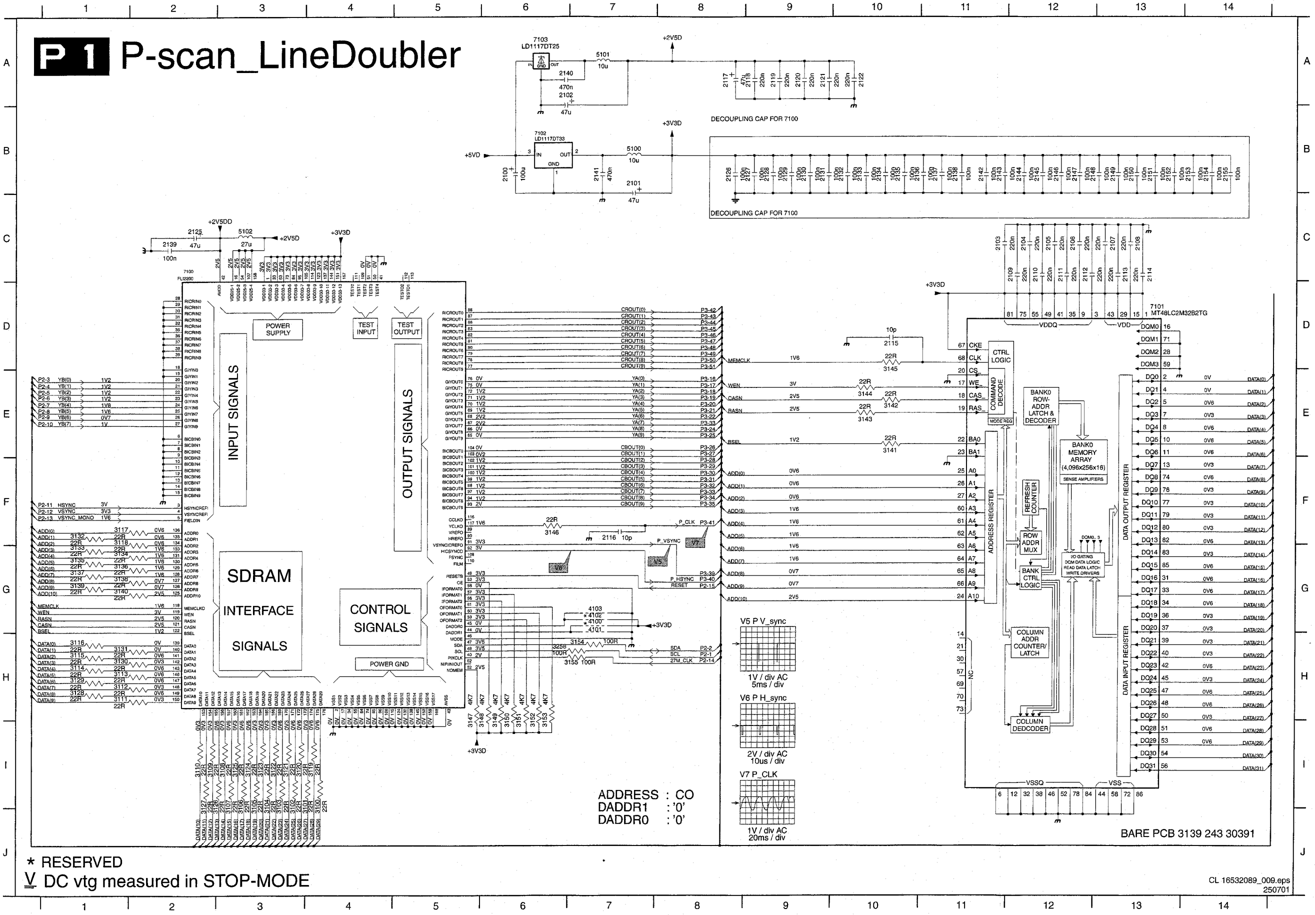
Layout Display Panel (Part 2 Bottom Side)


11
12
13
14
15
16
17
18
19
20
A
B
C
3139 243 30421
5239 210 91050
7401
7100
7101
7102
7103
7104
7105
6100
65
64
80
1
41
40
24
25
81
2104
2105
2106
2124
2131
2133
2134
2144
3102
3103
3104
3112
3113
3114
3118
3120
3121
3123
3125
3126
3143
3144

Part 2

CL 16532136_41b.eps
141101

P-Scan Line Doubler



P 1 P-scan_LineDoubler
7103 LD1117DT25
7102 LD1117DT33
+2V5D
+3V3D
+5VD
5101 10u
5100 10u
2140 470n
2102 47u
2100 100u
2141 470n
2101 47u
DECOUPLING CAP FOR 7100
7100 FLI2200
+2V5DD
2125 47u
2139 100n
5102 27u
INPUT SIGNALS
OUTPUT SIGNALS
POWER SUPPLY
TEST INPUT
TEST OUTPUT
SDRAM INTERFACE SIGNALS
CONTROL SIGNALS
POWER GND
7101 MT48LC2M32B2TG
CTRL LOGIC
COMMAND DECODE
MODE REG
BANK0 ROW-ADDR LATCH & DECODER
BANK0 MEMORY ARRAY (4,096x256x16)
SENSE AMPLIFIERS
REFRESH COUNTER
ROW ADDR MUX
BANK CTRL LOGIC
I/O GATING DQM DATA LOGIC READ DATA LATCH WRITE DRIVERS
COLUMN ADDR COUNTER/ LATCH
COLUMN DEDCODER
ADDRESS REGISTER
DATA OUTPUT REGISTER
DATA INPUT REGISTER
VDDQ
VDD
VSSQ
VSS
NC
V5 P V_sync
1V / div AC 5ms / div
V6 P H_sync
2V / div AC 10us / div
V7 P_CLK
1V / div AC 20ms / div
ADDRESS : CO
DADDR1 : '0'
DADDR0 : '0'
BARE PCB 3139 243 30391

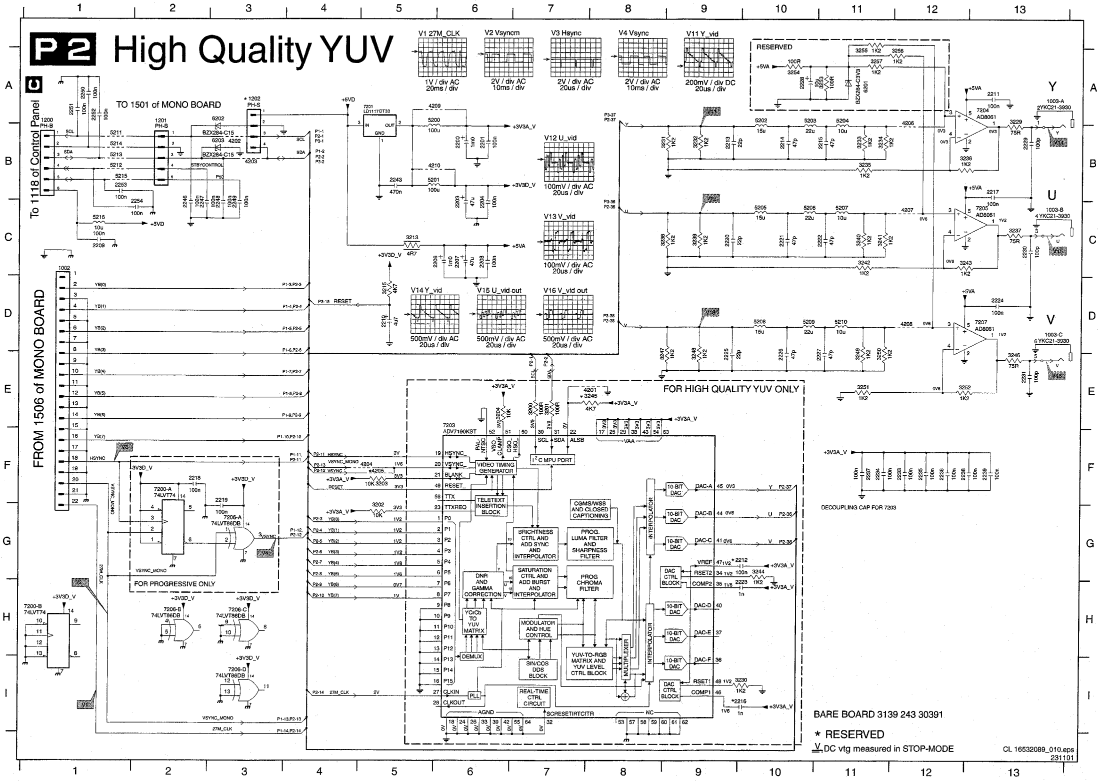
★ RESERVED

$\underline{V}$ DC vtg measured in STOP-MODE

CL 16532089_009.eps
250701

2100	B6
2101	B7
2102	A6
2103	C11
2104	C12
2105	C12
2106	C12
2107	C13
2108	C13
2109	C12
2110	C12
2111	C12
2112	C12
2113	C13
2114	C13
2115	D10
2116	F7
2117	A8
2118	A9
2119	A9
2120	A9
2121	A9
2122	A10
2125	C2
2126	B8
2127	B9
2128	B9
2129	B9
2130	B9
2131	B9
2132	B10
2133	B10
2134	B10
2135	B10
2136	B10
2137	B11
2138	B11
2139	C2
2140	A6
2141	B7
2142	B11
2143	B11
2144	B12
2145	B12
2146	B12
2147	B12
2148	B12
2149	B13
2150	B13
2151	B13
2152	B13
2153	B14
2154	B14
2155	B14
3100	I4
3101	I4
3102	I3
3103	I3
3104	I3
3105	I3
3106	I3
3107	I3
3108	I3
3109	I2
3110	I2
3111	H1
3112	H1
3113	H1
3114	H1
3115	H1
3116	H1
3117	F1
3118	F1
3119	I4
3120	I3
3121	I3
3122	I3
3123	I3
3124	I3
3125	I3
3126	I3
3127	I2
3128	H1
3129	H1
3130	H1
3131	H1
3132	F1
3133	F1
3134	G1
3135	G1
3136	G1
3137	G1
3138	G1
3139	G1
3140	G1
3141	E10
3142	E10
3143	E10
3144	E10
3145	D10
3146	F6
3147	I5
3148	I5
3149	I6
3150	I6
3151	I6
3152	I6
3153	I6
3154	H7
3155	H7
3258	H6
4100	G7
4101	G7
4102	G7
4103	G7
5100	B7
5101	A7
5102	C3

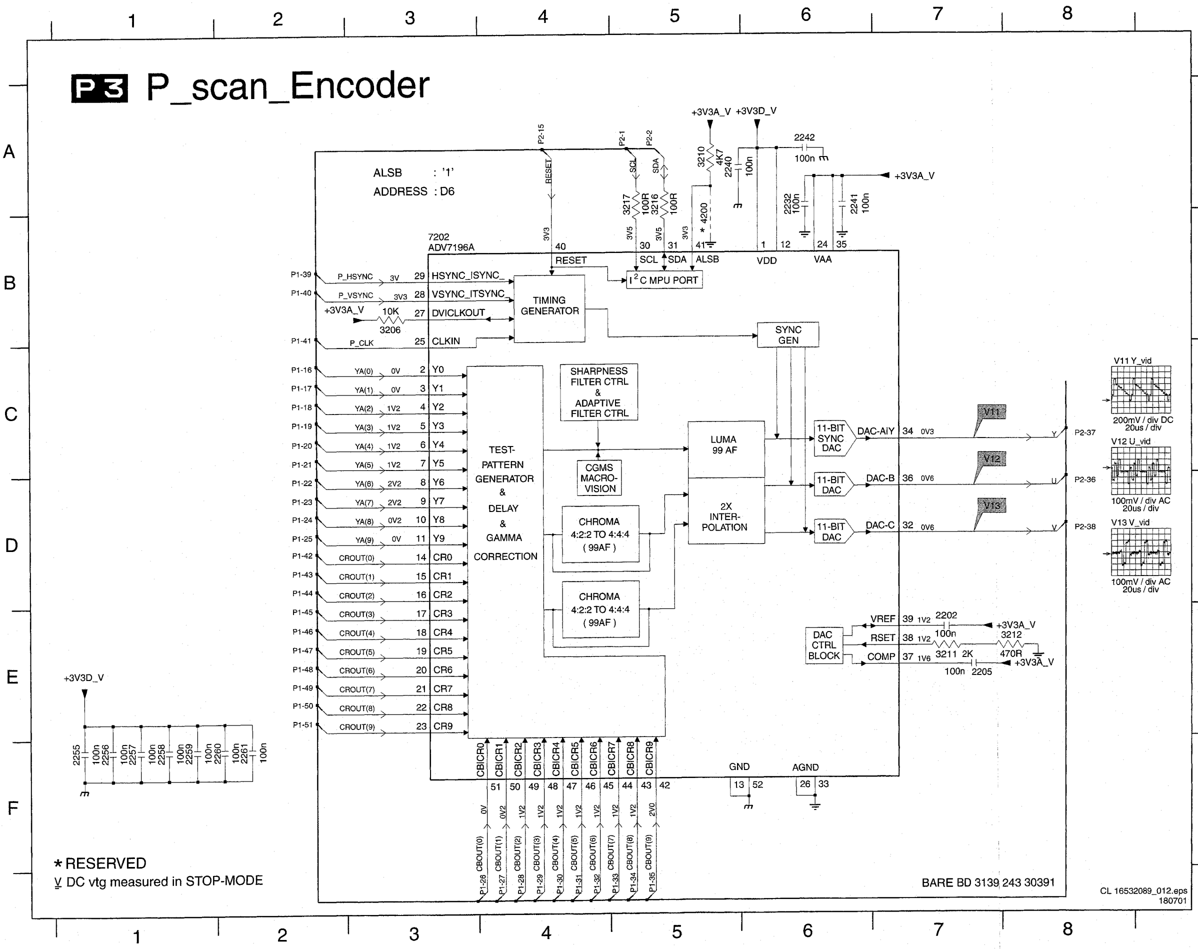
High Quality YUV


P2 High Quality YUV
C
To 1118 of Control Panel
TO 1501 of MONO BOARD
FROM 1506 of MONO BOARD
V1 27M_CLK 1V / div AC 20ms / div
V2 Vsyncm 2V / div AC 10ms / div
V3 Hsync 2V / div AC 20us / div
V4 Vsync 2V / div AC 10ms / div
V11 Y_vid 200mV / div DC 20us / div
V12 U_vid 100mV / div AC 20us / div
V13 V_vid 100mV / div AC 20us / div
V14 Y_vid 500mV / div AC 20us / div
V15 U_vid out 500mV / div AC 20us / div
V16 V_vid out 500mV / div AC 20us / div
RESERVED
Y
U
V
7204 AD8061
7205 AD8061
7207 AD8061
7201 LD1117DT33
7203 ADV7190KST
7200-A 74LVT74
7200-B 74LVT74
7206-A 74LVT86DB
7206-B 74LVT86DB
7206-C 74LVT86DB
7206-D 74LVT86DB
FOR PROGRESSIVE ONLY
FOR HIGH QUALITY YUV ONLY
VIDEO TIMING GENERATOR
I2C MPU PORT
TELETEXT INSERTION BLOCK
CGMS/WSS AND CLOSED CAPTIONING
BRIGHTNESS CTRL AND ADD SYNC AND INTERPOLATOR
PROG. LUMA FILTER AND SHARPNESS FILTER
SATURATION CTRL AND ADD BURST AND INTERPOLATOR
PROG CHROMA FILTER
DNR AND GAMMA CORRECTION
YCrCb TO YUV MATRIX
MODULATOR AND HUE CONTROL
YUV-TO-RGB MATRIX AND YUV LEVEL CTRL BLOCK
SIN/COS DDS BLOCK
REAL-TIME CTRL CIRCUIT
DEMUX
PLL
MULTIPLEXER
INTERPOLATOR
10-BIT DAC
DAC CTRL BLOCK
DECOUPLING CAP FOR 7203
BARE BOARD 3139 243 30391
* RESERVED
V DC vtg measured in STOP-MODE
CL 16532089_010.eps
231101

1002	C1
1003-A	A13
1003-B	C13
1003-C	D13
1200	A1
1201	A2
1202	A3
2200	B6
2201	B6
2203	C6
2204	C6
2206	C6
2207	C6
2208	C6
2209	C1
2210	D5
2211	A13
2212	G10
2213	B9
2214	B10
2215	B11
2216	I10
2217	B13
2218	F2
2219	F3
2220	C9
2221	C10
2222	C11
2223	H10
2224	D13
2225	E9
2226	E10
2227	E11
2228	A10
2229	B13
2230	C13
2231	E13
2233	F12
2234	F11
2235	F12
2236	F12
2237	F11
2238	F12
2239	F13
2243	B5
2246	C2
2247	C2
2248	C3
2249	C3
2250	A1
2251	A1
2252	A1
2253	B1
2254	C2
3200	E7
3201	E7
3202	F5
3203	F5
3204	E6
3213	C5
3215	D5
3229	A13
3230	I10
3231	B8
3232	B9
3233	B11
3234	B11
3235	B11
3236	B12
3237	C13
3238	C8
3239	C9
3240	C11
3241	C11
3242	C11
3243	C12
3244	G10
3245	E8
3246	E13
3247	E8
3248	E9
3249	E11
3250	E11
3251	E11
3252	E12
3253	A11
3254	A10
3255	A11
3256	A12
3257	A11
4201	E8
4202	B3
4203	B3
4204	F5
4205	F5
4206	B12
4207	C12
4208	D12
4209	A5
4210	B5
5200	A5
5201	B5
5202	A10
5203	A10
5204	A11
5205	C10
5206	C10
5207	C11
5208	D10
5209	D10
5210	D11
5211	B1
5212	B1
5213	B1
5214	B1
5215	B1
5216	C1
6201	A11
6202	A3
6203	B3
7200-A	F2
7200-B	H1
7201	A5
7203	E6
7204	A13
7205	C13
7206-A	G3
7206-B	H2
7206-C	H3
7206-D	I3
7207	D13

	DIVERSITY TABLE FOR DIAGRAM P2		
ITEM NO	DESCRIPTION	DVD962SA/691 DVD962SA/171 Progressive YUV	(Not use) High Quality YUV
2212	CER2 0603 X7R 16V 100N COL		X
2213	CER1 0603 NP0 50V 6P8 COL	X	
2213	CER1 0603 NP0 50V 27P COL		X
2214	CER1 0603 NP0 50V 22P COL	X	
2214	CER1 0603 NP0 50V 68P COL		X
2215	CER1 0603 NP0 50V 18P COL		
2216	CER2 0603 X7R 50V 1N COL		X
2218	CER2 0603 X7R 16V 100N COL	X	
2219	CER2 0603 X7R 16V 100N COL	X	
2220	CER1 0603 NP0 50V 6P8 COL	X	
2220	CER1 0603 NP0 50V 27P COL		X
2221	CER1 0603 NP0 50V 22P COL	X	
2221	CER1 0603 NP0 50V 68P COL		X
2222	CER1 0603 NP0 50V 18P COL	X	
2223	CER2 0603 X7R 50V 1N COL		X
2225	CER1 0603 NP0 50V 6P8 COL	X	
2225	CER1 0603 NP0 50V 27P COL		X
2226	CER1 0603 NP0 50V 22P COL	X	
2226	CER1 0603 NP0 50V 68P COL		X
2227	CER1 0603 NP0 50V 18P COL	X	
2229	CER1 0603 NP0 50V 100P COL		X
2230	CER1 0603 NP0 50V 100P COL		X
2231	CER1 0603 NP0 50V 100P COL		X
2232	CER2 0603 X7R 16V 100N COL	X	
2233	CER2 0603 X7R 16V 100N COL		X
2234	CER2 0603 X7R 16V 100N COL		X
2235	CER2 0603 X7R 16V 100N COL		X
2236	CER2 0603 X7R 16V 100N COL		X
2237	CER2 0603 X7R 16V 100N COL		X
2238	CER2 0603 X7R 16V 100N COL		X
2239	CER2 0603 X7R 16V 100N COL		X
3200	RST SM 0603 100R PM5 COL		X
3201	RST SM 0603 100R PM5 COL		X
3204	RST SM 0603 10K PM5 COL		X
3230	RST SM 0603 1K2 PM5 COL		X
3244	RST SM 0603 1K2 PM5 COL		X
3245	RST SM 0603 4K7 PM5 COL	X	
4204	RST SM 0603 JUMP. 0R05 COL		X
5202	FXDIND SM 0805 6U8 PM10 COL R	X	
5202	FXDIND SM 0805 22U PM20 COL R		X
5203	FXDIND SM 0805 10U PM10 COL R	X	
5203	RST SM 0805 JUMP. 0R05 COL R		X
5204	FXDIND SM 0805 2U2 PM10 COL R	X	
5204	FXDIND SM 0805 10U PM10 COL R		X
5205	FXDIND SM 0805 6U8 PM10 COL R	X	
5205	FXDIND SM 0805 22U PM20 COL R		X
5206	FXDIND SM 0805 10U PM10 COL R	X	
5206	RST SM 0805 JUMP. 0R05 COL R		X
5207	FXDIND SM 0805 2U2 PM10 COL R	X	
5207	FXDIND SM 0805 10U PM10 COL R		X
5208	FXDIND SM 0805 6U8 PM10 COL R	X	
5208	FXDIND SM 0805 22U PM20 COL R		X
5209	FXDIND SM 0805 10U PM10 COL R	X	
5209	RST SM 0805 JUMP. 0R05 COL R		X
5210	FXDIND SM 0805 2U2 PM10 COL R	X	
5210	FXDIND SM 0805 10U PM10 COL R		X
7200	IC SM 74LVT74DB (PHSE) R	X	
7203	IC SM ADV7190KST (ANA0) Y		X
7206	IC SM 74LVT86DB (PHSE) R	X	

P_Scan_Encoder


P3 P_scan_Encoder
ALSB : '1'
ADDRESS : D6
7202
ADV7196A
RESET
SCL
SDA
ALSB
VDD
VAA
I²C MPU PORT
TIMING GENERATOR
SYNC GEN
HSYNC_ISYNC_
VSYNC_ITSYNC_
DVICLKOUT
CLKIN
P_HSYNC
P_VSYNC
P_CLK
+3V3A_V
+3V3D_V
10K
3206
3210
4K7
2240
2242
100n
2232
2241
3217
3216
100R
4200
TEST-PATTERN GENERATOR & DELAY & GAMMA CORRECTION
SHARPNESS FILTER CTRL & ADAPTIVE FILTER CTRL
CGMS MACRO-VISION
CHROMA 4:2:2 TO 4:4:4 (99AF)
LUMA 99 AF
2X INTER-POLATION
11-BIT SYNC DAC
11-BIT DAC
DAC-A/Y
DAC-B
DAC-C
DAC CTRL BLOCK
VREF
RSET
COMP
2202
3212
470R
3211 2K
2205
GND
AGND
YA(0) … YA(9)
CROUT(0) … CROUT(9)
CBOUT(0) … CBOUT(9)
CBICR0 … CBICR9
P2-37
P2-36
P2-38
V11
V12
V13
V11 Y_vid
200mV / div DC
20us / div
V12 U_vid
100mV / div AC
20us / div
V13 V_vid
100mV / div AC
20us / div
2255
2256
2257
2258
2259
2260
2261
BARE BD 3139 243 30391
CL 16532089_012.eps
180701

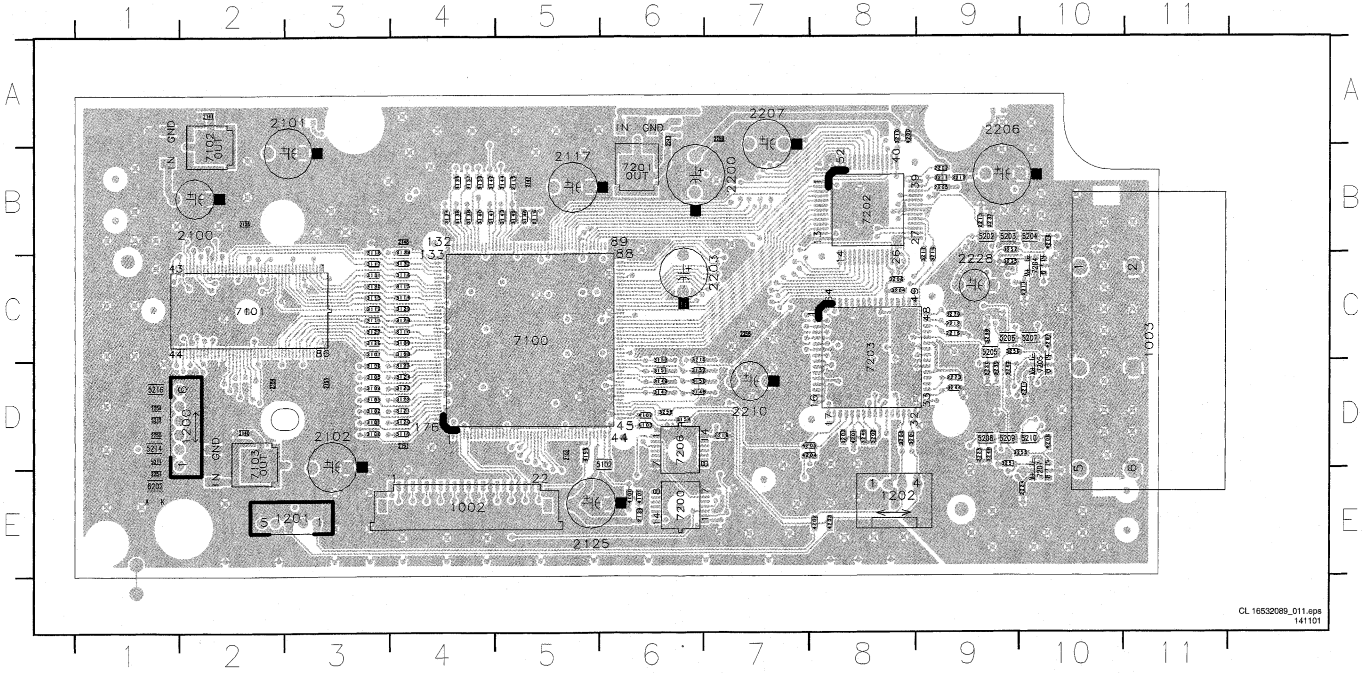
*RESERVED

V DC vtg measured in STOP-MODE

2202	E7
2205	E7
2232	A6
2240	A5
2241	A6
2242	A6
2255	F1
2256	F1
2257	F1
2258	F1
2259	F1
2260	F2
2261	F2
3206	B3
3210	A5
3211	E7
3212	E8
3216	A5
3217	A5
4200	B5
7202	B3

P-Scan Board (Top Side)

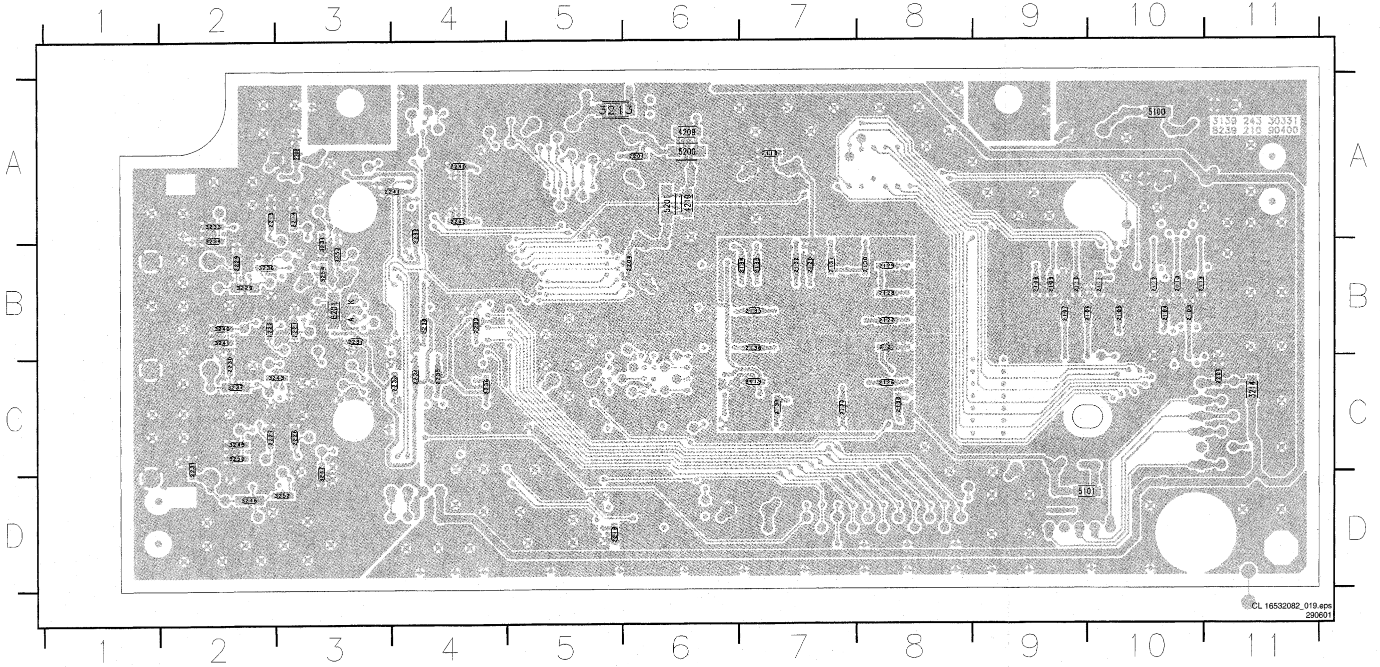
1002	E4
1003	C11
1200	D2
1201	E3
1202	E8
2100	B2
2101	A3
2102	D3
2115	B5
2116	B5
2117	B5
2125	E5
2139	E6
2140	D2
2141	A2
2147	B5
2148	B4
2151	D4
2152	D5
2153	D3
2154	D2
2155	B2
2200	B7
2202	B9
2203	C7
2205	B9
2206	A9
2207	A7
2210	D7
2211	C10
2212	C9
2213	B9
2216	C9
2217	D10
2219	D7
2220	D9
2223	D9
2224	E10
2225	D9
2228	C9
2243	A6
2250	D1
2251	E1
2254	D1
2256	C7
2259	A7
3100	D3
3101	D3
3102	D3
3103	D3
3104	D3
3105	D3
3106	D3
3107	C3
3108	C4
3109	C4
3110	C4
3111	C3
3112	C3
3113	C3
3114	C4
3115	C4
3116	C4
3117	C3
3118	B3
3119	D4
3120	D4
3121	D4
3122	D4
3123	D4
3124	D4
3125	D4
3126	C3
3127	C3
3128	C4
3129	C4
3130	C3
3131	C3
3132	C4
3133	B4
3134	B4
3135	B4
3136	B4
3137	B4
3138	B4
3139	B4
3140	B4
3141	B4
3142	B4
3143	B5
3144	B5
3145	B5
3146	B5
3147	D6
3148	D6
3149	D6
3150	D6
3151	D6
3152	D6
3153	C6
3154	D6
3155	D5
3200	D8
3201	D8
3202	D8
3203	D8
3204	C8
3206	C8
3210	A8
3211	B9
3212	B9
3215	C6
3216	C9
3217	C9
3230	C9
3232	B9
3235	C9
3238	C9
3239	D9
3242	D9
3244	D9
3245	D8
3248	D9
3251	D9
3255	D10
3256	C9
3257	B9
3258	D6
4100	E6
4101	E6
4102	D6
4103	D6
4200	A8
4201	D8
4202	E8
4203	E8
4204	D8
4205	D8
4206	B10
4207	C10
4208	D10
5102	D6
5202	B9
5203	B9
5204	B10
5205	C9
5206	C9
5207	C10
5208	D9
5209	D9
5210	D10
5211	D1
5212	D1
5214	D1
5216	D1
6202	E1
7100	C5
7101	C2
7102	B2
7103	D2
7200	E6
7201	B6
7202	B8
7203	C8
7204	C10
7205	D10
7206	D6
7207	E10


1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
IN
GND
7102
OUT
2101
2100
7101
43
1
44
86
7100
132
133
176
89
88
45
44
2117
7201
OUT
2200
2207
2206
2203
7202
52
40
39
27
26
14
13
7203
49
48
33
32
17
16
2228
2210
1003
5202
5203
5204
5205
5206
5207
5208
5209
5210
7204
7205
7207
7206
7200
5102
1202
1002
22
2125
2102
7103
OUT
1200
1201
5
5216
5214
6202
A
K

CL 16532089_011.eps
141101

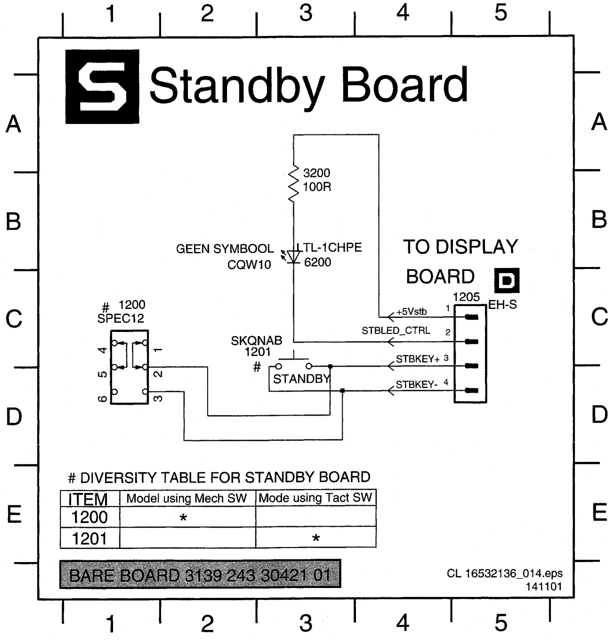
P-Scan Board (Bottom Side)

2103	B10
2104	B10
2105	B10
2106	B10
2107	B9
2108	B9
2109	B9
2110	B9
2111	B10
2112	B10
2113	B10
2114	B10
2118	A7
2119	C7
2120	B7
2121	B8
2122	C7
2126	C8
2127	B8
2128	B8
2129	B8
2130	B8
2131	B7
2132	B7
2133	B7
2134	B7
2135	B7
2136	B7
2137	C7
2138	C8
2201	A6
2204	B6
2208	A3
2209	C11
2214	A3
2215	A2
2218	D5
2221	B3
2222	B2
2226	C3
2227	C2
2229	B2
2230	C2
2231	C2
2232	A4
2233	C4
2234	C4
2235	C4
2236	C4
2237	B3
2238	B4
2239	B4
2240	A4
2241	A4
2242	A4
3213	A5
3214	C11
3229	B2
3231	B3
3233	A2
3234	A2
3236	B2
3237	C2
3240	B2
3241	B2
3243	C3
3246	D2
3247	C3
3249	C2
3250	C2
3252	D3
3253	B3
3254	B3
4209	A6
4210	A6
5100	A10
5101	D9
5200	A6
5201	A6
6201	B3


1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
3213
4209
5200
5201
4210
5100
5101
3214
6201
A K
3139 243 30331
8239 210 90400

CL 16532082_019.eps
290601

Standby Board


S
Standby Board
1
2
3
4
5
A
B
C
D
E
3200
100R
GEEN SYMBOOL
CQW10
LTL-1CHPE
6200
TO DISPLAY
BOARD
D
1205
EH-S
+5Vstb
STBLED_CTRL
STBKEY+
STBKEY-
# 1200
SPEC12
SKQNAB
1201
#
STANDBY
BARE BOARD 3139 243 30421 01
CL 16532136_014.eps
141101

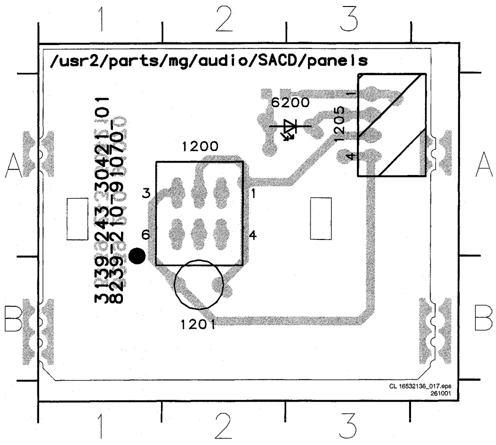
DIVERSITY TABLE FOR STANDBY BOARD

ITEM	Model using Mech SW	Mode using Tact SW
1200	*	
1201		*

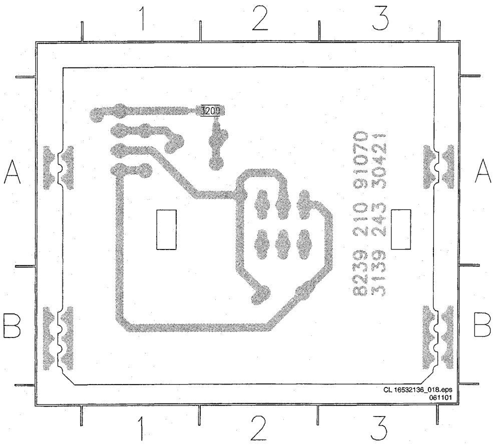
1200	C1
1201	C3
1205	C5
3200	A3
6200	B3

Layout Standby Board (Top Side)

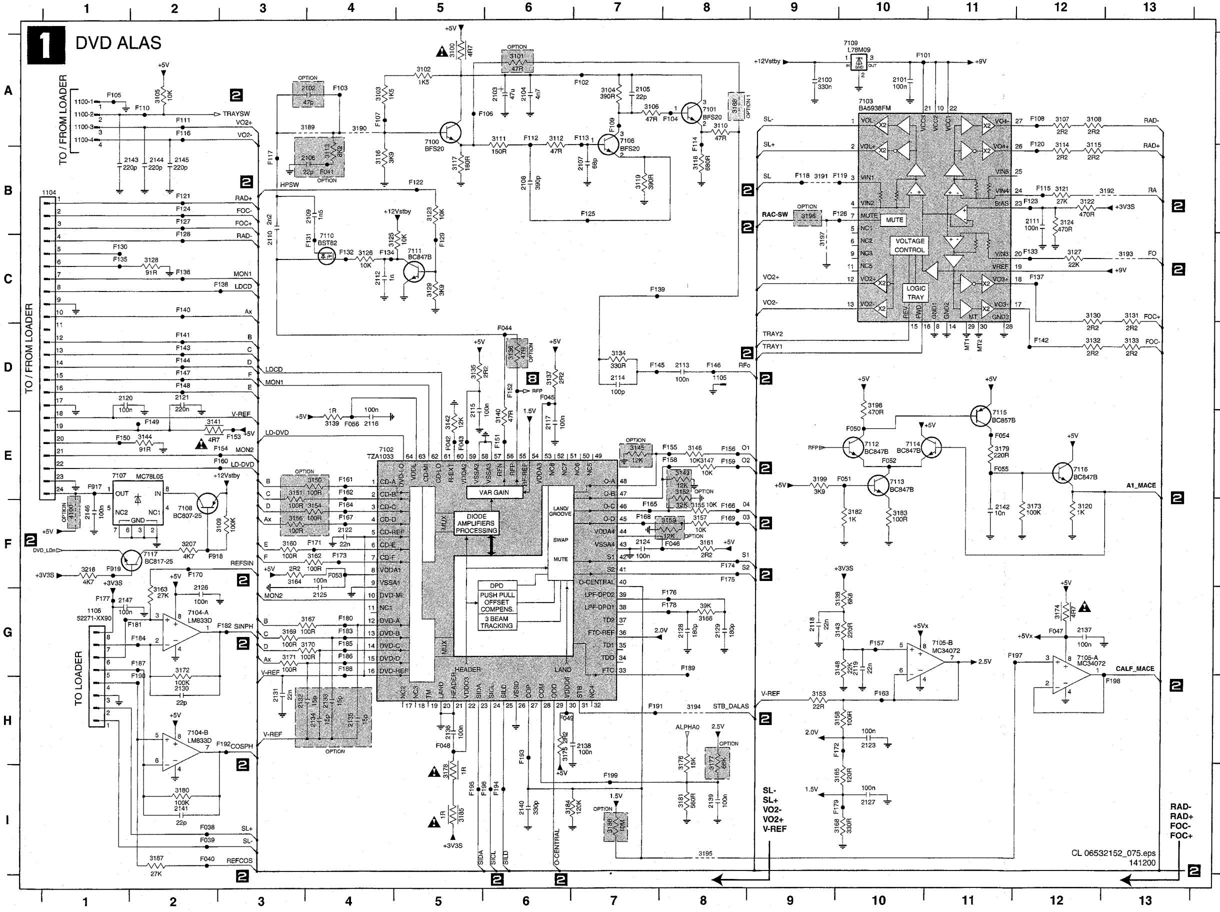
1200	A2
1201	B2
1205	A3
6200	A3


1
2
3
A
B
/usr2/parts/mg/audio/SACD/panels
6200
1205
1200
1201
3139 243 30421 01
8239 210 91070
CL 16532136_017.eps
261001

Layout Standby Board (Bottom Side)

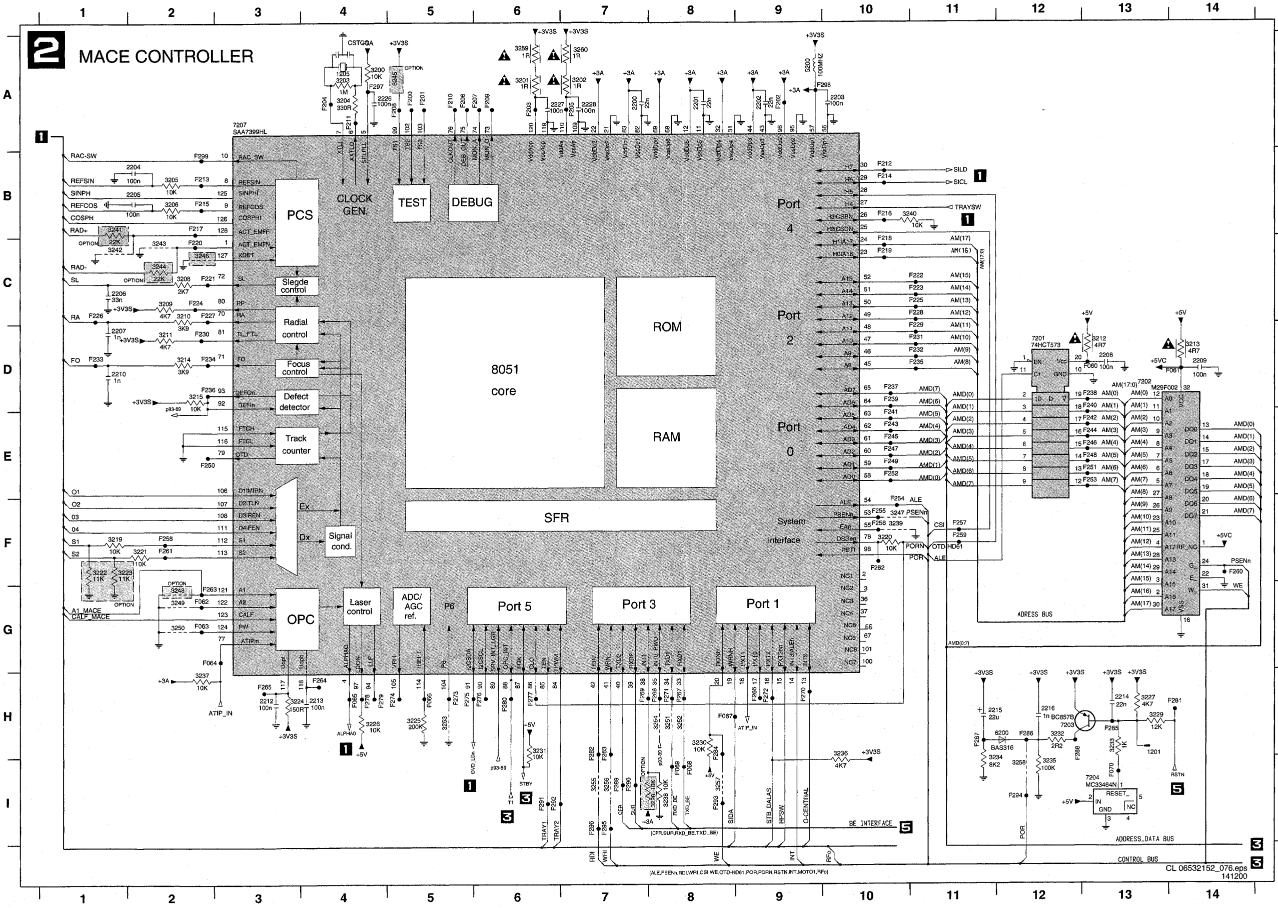

1
2
3
A
B
3200
8239 210 91070
3139 243 30421
CL 16532136_018.eps
061101

Mono Board: DVD ALAS


1 DVD ALAS
A
B
C
D
E
F
G
H
I
1 2 3 4 5 6 7 8 9 10 11 12 13
TO / FROM LOADER
1100-1
1100-2
1100-3
1100-4
TRAYSW
VO2+
VO2-
2143 220p
2144 220p
2145 220p
1104
RAD+
FOC-
FOC+
RAD-
MON1
LDCD
Ax
B
C
D
F
E
V-REF
LD-DVD
MON2
+5V
+12Vstby
7107 MC78L05
7108 BC807-25
7117 BC817-25
DVD_LDn
+3V3S
REFSIN
1106 52271-XX90
TO LOADER
7104-A LM833D
7104-B LM833D
SINPH
COSPH
SL+
SL-
REFCOS
OPTION
7100 BFS20
7101 BFS20
7106 BFS20
7110 BST82
7111 BC847B
HPSW
LDCD
MON1
LD-DVD
7102 TZA1033
VAR GAIN
DIODE AMPLIFIERS PROCESSING
MUX
LAND/GROOVE
SWAP
MUTE
DPD
PUSH PULL OFFSET COMPENS.
3 BEAM TRACKING
HEADER
LAND
CD-A
CD-B
CD-C
CD-D
CD-REF
CD-E
CD-F
VDDA1
VSSA1
DVD-MI
NC1
DVD-A
DVD-B
DVD-C
DVD-D
DVD-REF
O-A
O-B
O-C
O-D
VDDA4
VSSA4
S1
S2
O-CENTRAL
LPF-DPD2
LPF-DPD1
TD2
FTC-REF
TD1
TDO
FTC
RFP
STB_DALAS
ALPHA0
2.5V
2.0V
1.5V
SIDA
SICL
SILD
O-CENTRAL
7109 L78M09
+9V
7103 BA5938FM
SL-
SL+
SL
RAC-SW
TRAY2
TRAY1
RFo
MUTE
VOLTAGE CONTROL
LOGIC TRAY
RAD-
RAD+
RA
+3V3S
FO
FOC+
FOC-
7112 BC847B
7113 BC847B
7114 BC847B
7115 BC857B
7116 BC847B
A1_MACE
7105-B MC34072
7105-A MC34072
+5Vx
CALF_MACE
V-REF
SL-
SL+
VO2-
VO2+
V-REF
RAD-
RAD+
FOC-
FOC+
CL 06532152_075.eps
141200

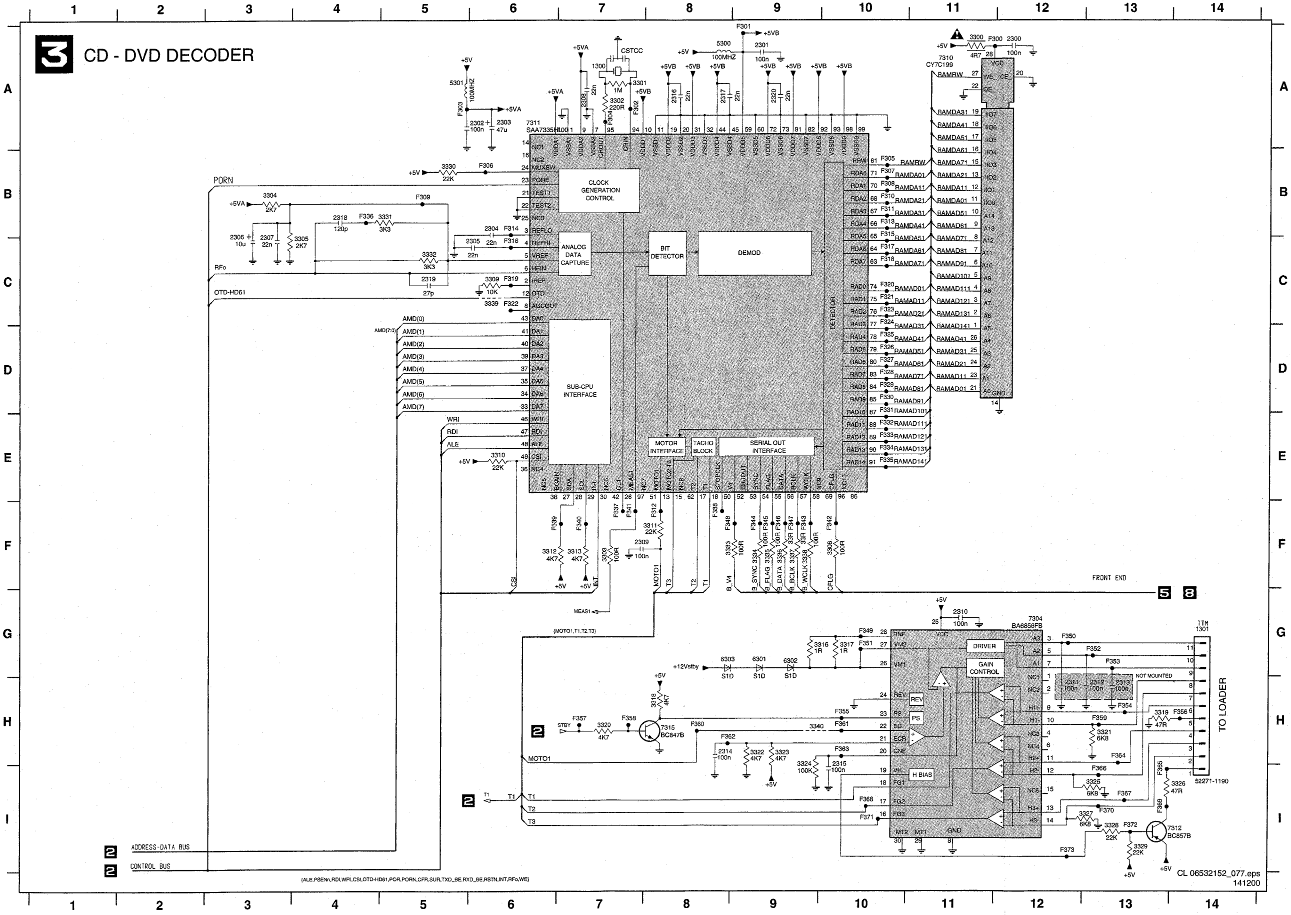
1100-1	A1
1100-2	A1
1100-3	A1
1100-4	A1
1104	B1
1105	D8
1106	G1
2100	A9
2101	A10
2102	A4
2103	A6
2104	A6
2105	A7
2106	B4
2107	B7
2108	B6
2109	B4
2110	C3
2111	B12
2112	C4
2113	D8
2114	D7
2115	E5
2116	E4
2117	E6
2118	G9
2119	G10
2120	D1
2121	D2
2122	F4
2123	H10
2124	F7
2125	G4
2126	G2
2127	I10
2128	G8
2129	G8
2130	H2
2131	H3
2132	H3
2133	H4
2134	H4
2135	H4
2136	H5
2137	G12
2138	H7
2139	I8
2140	I6
2141	I2
2142	F11
2143	B2
2144	B2
2145	B2
2146	F1
2147	G1
3100	A5
3101	A6
3102	A5
3103	A4
3104	A7
3105	A2
3106	A7
3107	A12
3108	A12
3109	F2
3110	A8
3111	A6
3112	A6
3113	B4
3114	B12
3115	B12
3116	B4
3117	B5
3118	B8
3119	B7
3120	F12
3121	B12
3122	B12
3123	B5
3124	B12
3125	C4
3126	C4
3127	C12
3128	C2
3129	C5
3130	C12
3131	C13
3132	D12
3133	D13
3134	D7
3135	D5
3136	D6
3137	D6
3138	G10
3139	E4
3140	E6
3141	E2
3142	E5
3143	G10
3144	E2
3145	E7
3146	E8
3147	E8
3148	G10
3149	E8
3150	E4
3151	E3
3152	E8
3153	H9
3154	F4
3155	F8
3156	F3
3157	F8
3158	H10
3159	F8
3160	F3
3161	F8
3162	F4
3163	G2
3164	F3
3165	I10
3166	G8
3167	G4
3168	I10
3169	G3
3170	G4
3171	G3
3172	G2
3173	F12
3174	G12
3175	H6
3176	H8
3177	H8
3178	I5
3179	E11
3180	I2
3181	I8
3182	F10
3183	F10
3184	I6
3185	I5
3186	I7
3187	I2
3188	A8
3189	A4
3190	A4
3191	B9
3192	B13
3193	C13
3194	H8
3195	I8
3196	B9
3197	C9
3198	D10
3199	E9
3207	F2
3216	F1
4100	F1
7100	A5
7101	A8
7102	E4
7103	A10
7104-A	G2
7104-B	H2
7105-A	G12
7105-B	G11
7106	A7
7107	E1
7108	F2
7109	A10
7110	C4
7111	C5
7112	E10
7113	E10
7114	E10
7115	E11
7116	E12
7117	F2
F038	I2
F039	I2
F040	I2
F041	B4
F042	E5
F043	E5
F044	D6
F045	D6
F046	F8
F047	G12
F048	H5
F049	H6
F050	E10
F051	E10
F052	E10
F053	F4
F054	E11
F055	E11
F056	E4
F101	A10
F102	A7
F103	A4
F104	A8
F105	A1
F106	A6
F107	A4
F108	A12
F109	A7
F110	A2
F111	A2
F112	A6
F113	A7
F114	A8
F115	B12
F116	A2
F117	B3
F118	B9
F119	B10
F120	B12
F121	B2
F122	B5
F123	B12
F124	B2
F125	B7
F126	B10
F127	B2
F128	C2
F129	C5
F130	C1
F131	C4
F132	C4
F133	C12
F134	C4
F135	C1
F136	C2
F137	C12
F138	C3
F139	C7
F140	C2
F141	D2
F142	D12
F143	D2
F144	D2
F145	D7
F146	D8
F147	D2
F148	D2
F149	E2
F150	E1
F151	E6
F152	D6
F153	E3
F154	E3
F155	E8
F156	E8
F157	G10
F158	E8
F159	E8
F160	E3
F161	E4
F162	E4
F163	H10
F164	F4
F165	F7
F166	F8
F167	F4
F168	F7
F169	F8
F170	F2
F171	F4
F172	H10
F173	F4
F174	F8
F175	F8
F176	G8
F177	G1
F178	G8
F179	I10
F180	G4
F181	G2
F182	G3
F183	G4
F184	G2
F185	G4
F186	G4
F187	G2
F188	G4
F189	G8
F190	H2
F191	H7
F192	H3
F193	H6
F194	I6
F195	I5
F196	I6
F197	G12
F198	H13
F199	I7
F917	E1
F918	F2
F919	F1

Mono Board: MACE Controller


2
MACE CONTROLLER
7207
SAA7399HL
PCS
CLOCK GEN.
TEST
DEBUG
Port 4
Port 2
Port 0
System interface
8051 core
ROM
RAM
SFR
Slegde control
Radial control
Focus control
Defect detector
Track counter
Signal cond.
Ex
Dx
OPC
Laser control
ADC/ AGC ref.
P6
Port 5
Port 3
Port 1
RAC-SW
REFSIN
SINPH
REFCOS
COSPH
RAD+
RAD-
SL
RA
FO
O1
O2
O3
O4
S1
S2
A1_MACE
CALF_MACE
ATIP_IN
OPTION
CSTCGA
1205
5200
100MHZ
+3V3S
+3A
+5V
+5VC
SILD
SICL
TRAYSW
AM(17:0)
AMD(0:7)
7201
74HCT573
7202
M29F002
ADRESS BUS
ADDRESS_DATA BUS
CONTROL BUS
BE INTERFACE
7203
BC857B
7204
MC33464N
RESET_
6200
BAS316
RSTN
TRAY1
TRAY2
SIDA
STB_DALAS
HPSW
O-CENTRAL
RDI
WRI
WE
INT
RFo
STBY
T1
ALPHA0
(CFR,SUR,RXD_BE,TXD_BE)
(ALE,PSENn,RDI,WRI,CSI,WE,OTD-HD61,POR,PORN,RSTN,INT,MOTO1,RFo)
CL 06532152_076.eps
141200

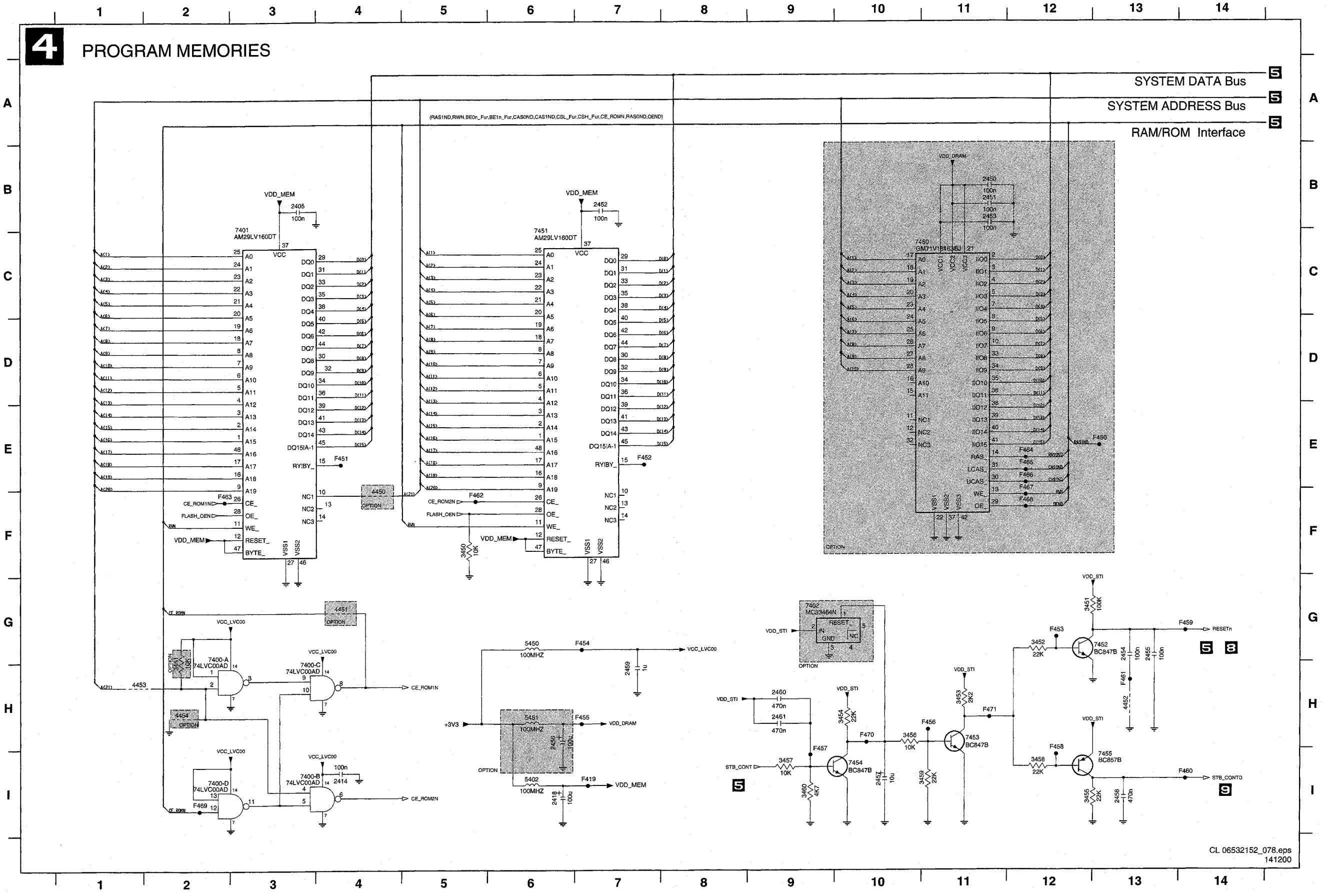
1201	H13
1205	A4
2200	A7
2201	A8
2202	A9
2203	A10
2204	B2
2205	B2
2206	C1
2207	D1
2208	D13
2209	D14
2210	D1
2212	H3
2213	H4
2214	H13
2215	H11
2216	H12
2226	A4
2227	A6
2228	A7
3200	A4
3201	A6
3202	A7
3203	A4
3204	A4
3205	B2
3206	B2
3208	C2
3209	C2
3210	C2
3211	D2
3212	D13
3213	D14
3214	D2
3215	D2
3219	F1
3220	F10
3221	F2
3222	F1
3223	F1
3224	H3
3225	H5
3226	H4
3227	H13
3228	I8
3229	H13
3230	H8
3231	H6
3232	H12
3233	H13
3234	I11
3235	I12
3236	H10
3237	H2
3238	I8
3239	F10
3240	B10
3241	B1
3242	C1
3243	C2
3244	C2
3245	A5
3246	C2
3247	F10
3248	G2
3249	G2
3250	G2
3251	H8
3252	H8
3253	H5
3254	H8
3255	I7
3256	I7
3257	I8
3258	I12
3259	A6
3260	A7
5200	A9
6200	H12
7201	D12
7202	D13
7203	H12
7204	I13
7207	A3
F060	D13
F061	D14
F062	G2
F063	G2
F064	G2
F065	H4
F066	H5
F067	H8
F068	I8
F069	I8
F070	I13
F200	A5
F201	A5
F202	A9
F203	A6
F204	A4
F205	A7
F206	A5
F207	A6
F208	A5
F209	A6
F210	A5
F211	A4
F212	B10
F213	B2
F214	B10
F215	B2
F216	B10
F217	B2
F218	C10
F219	C10
F220	C2
F221	C2
F222	C11
F223	C11
F224	C2
F225	C11
F226	C1
F227	C2
F228	C11
F229	D11
F230	D2
F231	D11
F232	D11
F233	D1
F234	D2
F235	D11
F236	D2
F237	D10
F238	D13
F239	D10
F240	D13
F241	E10
F242	E13
F243	E10
F244	E13
F245	E10
F246	E13
F247	E10
F248	E13
F249	E10
F250	E2
F251	E13
F252	E10
F253	E13
F254	F10
F255	F10
F256	F10
F257	F11
F258	F2
F259	F11
F260	F14
F261	F2
F262	F10
F263	G2
F264	H4
F265	H3
F266	H9
F267	H8
F268	H8
F269	H7
F270	H9
F271	H8
F272	H9
F273	H5
F274	H5
F275	H5
F276	H6
F277	H6
F278	H4
F279	H4
F280	H6
F281	H14
F282	H7
F283	H7
F284	H8
F285	H13
F286	H12
F287	H11
F288	H12
F289	I7
F290	I7
F291	I6
F292	I6
F293	I8
F294	I12
F295	I7
F296	I7
F297	A4
F298	A10
F299	B2

Mono Board: CD - DVD Decoder


3
CD - DVD DECODER
7311 SAA7335HL
CLOCK GENERATION CONTROL
ANALOG DATA CAPTURE
BIT DETECTOR
DEMOD
DETECTOR
SUB-CPU INTERFACE
MOTOR INTERFACE
TACHO BLOCK
SERIAL OUT INTERFACE
7310 CY7C199
7304 BA6856FB
DRIVER
GAIN CONTROL
REV
PS
H BIAS
7315 BC847B
7312 BC857B
1301 TTM
52271-1190
TO LOADER
FRONT END
NOT MOUNTED
PORN
RFo
OTD-HD61
AMD(7:0)
WRI
RDI
ALE
MEAS1
(MOTO1,T1,T2,T3)
MOTO1
T1
T2
T3
STBY
+12Vstby
ADDRESS-DATA BUS
CONTROL BUS
(ALE,PSENn,RDI,WRI,CSI,OTD-HD61,POR,PORN,CFR,SUR,TXD_BE,RXD_BE,RSTN,INT,RFo,WE)
CL 06532152_077.eps
141200

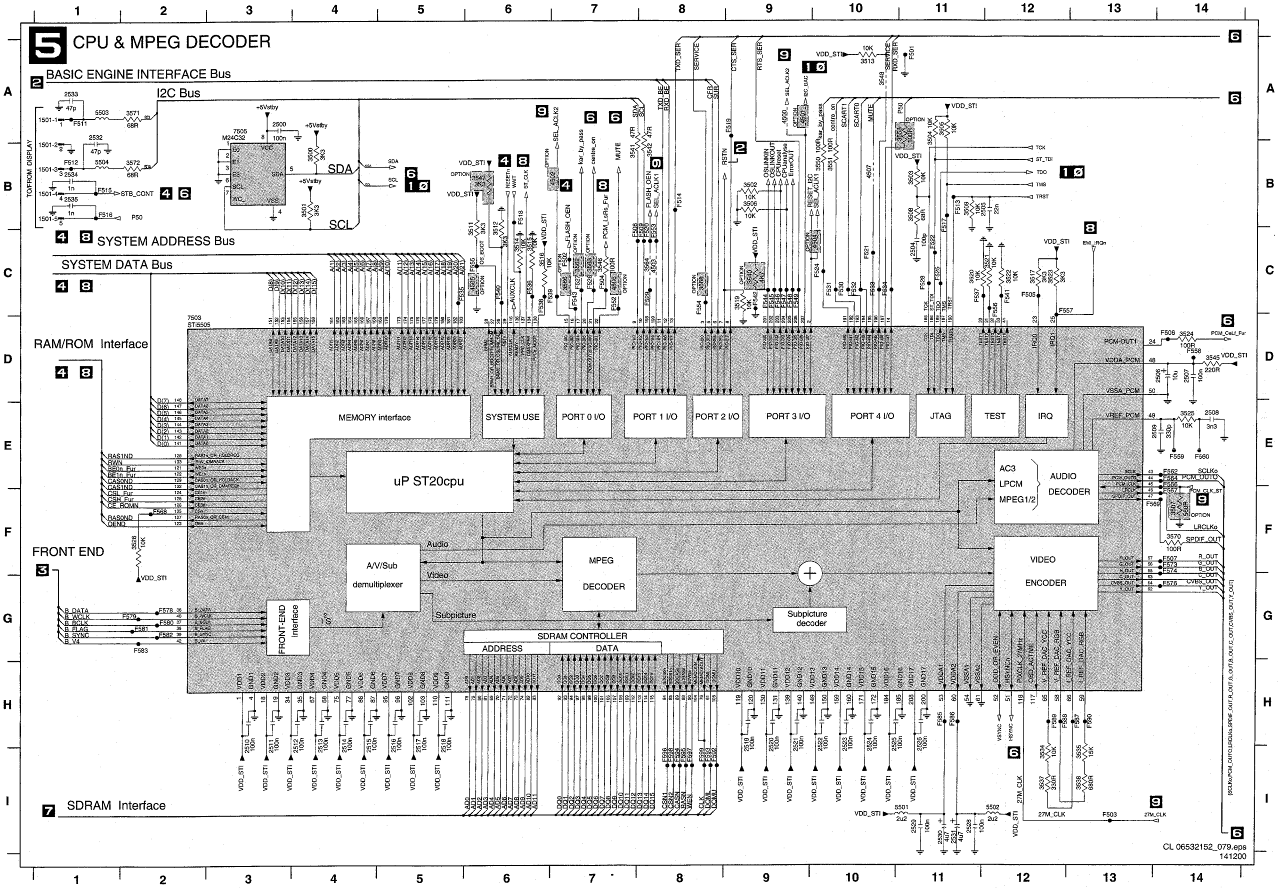
1300	A7
1301	G14
2300	A12
2301	A9
2302	A6
2303	A6
2304	B6
2305	C6
2306	C3
2307	C3
2308	A7
2309	F7
2310	G11
2311	H12
2312	H13
2313	H13
2314	H8
2315	I10
2316	A8
2317	A8
2318	B4
2319	C5
2320	A9
3300	A11
3301	A7
3302	A7
3303	F7
3304	B3
3305	C4
3306	F10
3309	C6
3310	E6
3311	F8
3312	F6
3313	F7
3316	G10
3317	G10
3318	H8
3319	H13
3320	H7
3321	H13
3322	H9
3323	H9
3324	I9
3325	I13
3326	I14
3327	I13
3328	I13
3329	I13
3330	B5
3331	B5
3332	C5
3333	F8
3334	F9
3335	F9
3336	F9
3337	F9
3338	F9
3339	C6
3340	H9
5300	A8
5301	A5
6301	G9
6302	G9
6303	G8
7304	G12
7310	A11
7311	A6
7312	I13
7315	H8
F300	A11
F301	A9
F302	A7
F303	A5
F304	A7
F305	B10
F306	B6
F307	B10
F308	B10
F309	B5
F310	B10
F311	B10
F312	F8
F313	B10
F314	B6
F315	C10
F316	C6
F317	C10
F318	C10
F319	C6
F320	C10
F321	C10
F322	C6
F323	C10
F324	D10
F325	D10
F326	D10
F327	D10
F328	D10
F329	D10
F330	D10
F331	E10
F332	E10
F333	E10
F334	E10
F335	E10
F336	B4
F337	F7
F338	F8
F339	F6
F340	F7
F341	F7
F342	F10
F343	F9
F344	F9
F345	F9
F346	F9
F347	F9
F348	F8
F349	G10
F350	G12
F351	G10
F352	G13
F353	G13
F354	H13
F355	H10
F356	H14
F357	H7
F358	H7
F359	H13
F360	H8
F361	H10
F362	H8
F363	H10
F364	H13
F365	I13
F366	I13
F367	I13
F368	I10
F369	I13
F370	I13
F371	I10
F372	I13
F373	I12

Mono Board: Program Memories


4
PROGRAM MEMORIES
SYSTEM DATA Bus
SYSTEM ADDRESS Bus
RAM/ROM Interface
5
(RAS1ND,RWN,BE0n_Fur,BE1n_Fur,CAS0ND,CAS1ND,CSL_Fur,CSH_Fur,CE_ROMN,RAS0ND,OEND)
VDD_MEM
2405 100n
7401 AM29LV160DT
2452 100n
7451 AM29LV160DT
VDD_DRAM
2450 100n
2451 100n
2453 100n
7450 GM71V18163CJ
4450 OPTION
4451 OPTION
4454 OPTION
3461 10K OPTION
F451
F452
F462
F463
F450
F464
F465
F466
F467
F468
CE_ROM1N
CE_ROM2N
FLASH_OEN
RWN
CE_ROMN
3450 10K
VCC_LVC00
7400-A 74LVC00AD
7400-B 74LVC00AD
7400-C 74LVC00AD
7400-D 74LVC00AD
4453
F469
2414 100n
5450 100MHZ
F454
VCC_LVC00
2459 1u
+3V3
5451 100MHZ
F455
VDD_DRAM
2456 100u
OPTION
5402 100MHZ
F419
VDD_MEM
2418 100u
7402 MC33464N
RESET
IN
GND
NC
OPTION
VDD_STI
2460 470n
2461 470n
STB_CONT
3457 10K
F457
3460 4K7
3454 22K
7454 BC847B
F470
2457 10u
3456 10K
F456
3459 22K
3453 2K2
F471
7453 BC847B
F453
3452 22K
7452 BC847B
3451 100K
2454 100n
2455 100n
F461
4452
F459
RESETn
5 8
F458
3458 22K
7455 BC857B
3455 22K
2458 470n
F460
STB_CONTO
9
OPTION
CL 06532152_078.eps
141200

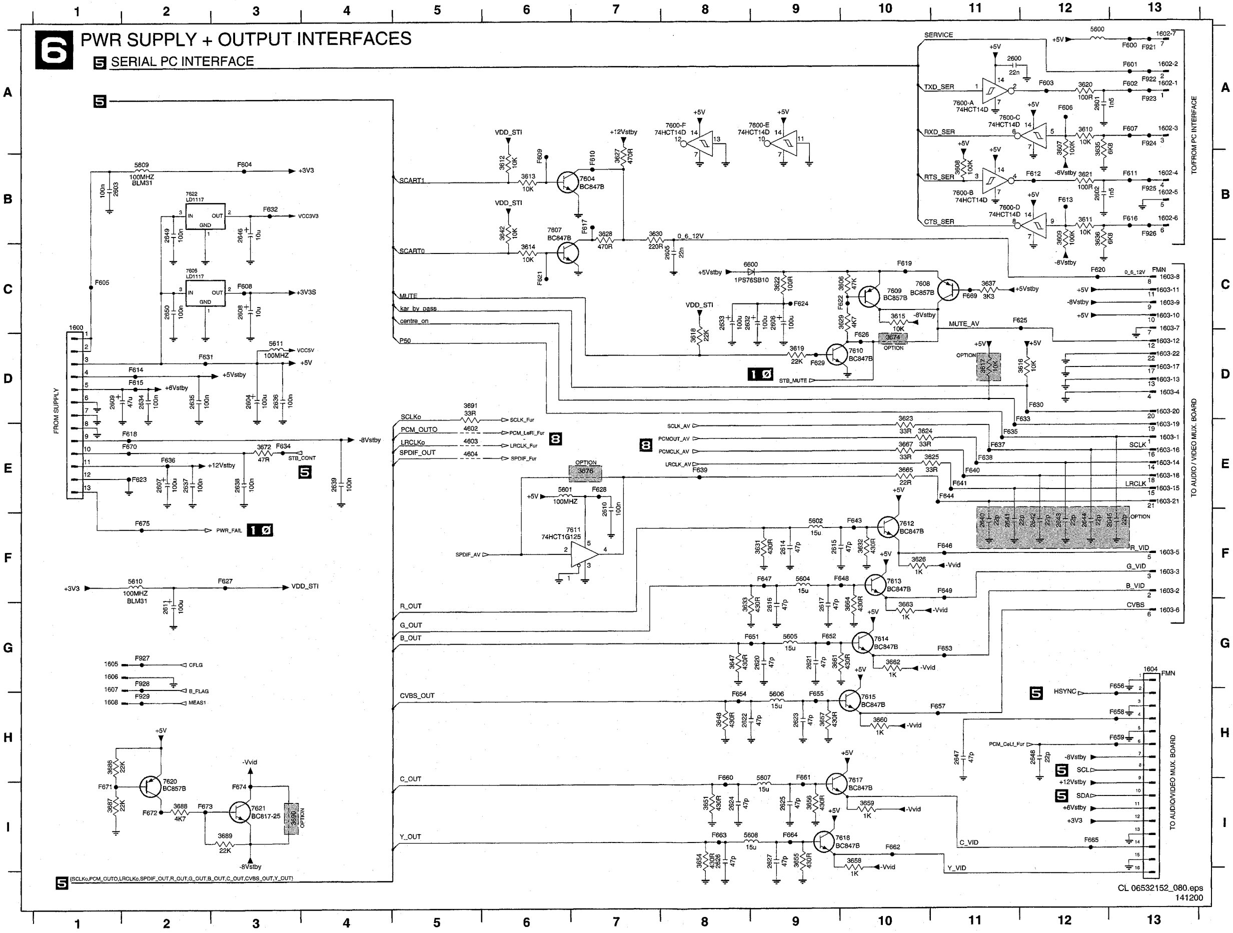
2405	B3
2414	I4
2418	I6
2450	B11
2451	B11
2452	B7
2453	B11
2454	G13
2455	G13
2456	H6
2457	I10
2458	I13
2459	H7
2460	H9
2461	H9
3450	F5
3451	G12
3452	G12
3453	H11
3454	H10
3455	I12
3456	H10
3457	I9
3458	I12
3459	I11
3460	I9
3461	G2
4450	F4
4451	G4
4452	H13
4453	H1
4454	H2
5402	I6
5450	G6
5451	H6
7400-A	G2
7400-B	I3
7400-C	H3
7400-D	I2
7401	C3
7402	G9
7450	C10
7451	C6
7452	G13
7453	H11
7454	I10
7455	I13
F419	I7
F450	E13
F451	E4
F452	E7
F453	G12
F454	G7
F455	H7
F456	H11
F457	I9
F458	I12
F459	G14
F460	I14
F461	H13
F462	F5
F463	F2
F464	E12
F465	E12
F466	E12
F467	F12
F468	F12
F469	I2
F470	H10
F471	H11

Mono Board: CPU & MPEG Decoder


5 CPU & MPEG DECODER
2 BASIC ENGINE INTERFACE Bus
I2C Bus
TO/FROM DISPLAY
4 8 SYSTEM ADDRESS Bus
SYSTEM DATA Bus
4 8
RAM/ROM Interface
4 8
FRONT END
3
7 SDRAM Interface
7505 M24C32
7503 STi5505
MEMORY interface
SYSTEM USE
PORT 0 I/O
PORT 1 I/O
PORT 2 I/O
PORT 3 I/O
PORT 4 I/O
JTAG
TEST
IRQ
uP ST20cpu
AC3 LPCM MPEG1/2
AUDIO DECODER
A/V/Sub demultiplexer
Audio
Video
Subpicture
MPEG DECODER
VIDEO ENCODER
Subpicture decoder
FRONT-END Interface
SDRAM CONTROLLER
ADDRESS
DATA
SDA
SCL
STB_CONT
P50
TXD_SER
SERVICE
CTS_SER
RTS_SER
RXD_SER
VDD_STI
+5Vstby
PCM_Cell_Fur
PCM-OUT1
VDDA_PCM
VSSA_PCM
VREF_PCM
SCLKo
PCM_OUTO
PCM_CLK_ST
LRCLKo
SPDIF_OUT
R_OUT
G_OUT
B_OUT
C_OUT
CVBS_OUT
Y_OUT
27M_CLK
6
9
1 0
CL 06532152_079.eps
141200

Component	Location
1501-1	A1
1501-2	B1
1501-3	B1
1501-4	B1
1501-5	B1
2500	A3
2504	C11
2505	B12
2506	D14
2507	D14
2508	E14
2509	E14
2510	H3
2511	H3
2512	H4
2513	H4
2514	H4
2515	H4
2516	H5
2517	H5
2518	H5
2519	H9
2520	H9
2521	H9
2522	H10
2523	H10
2524	H10
2525	H11
2526	H11
2528	I11
2529	I11
2530	I11
2531	I11
2532	A1
2533	A1
2534	B1
2535	B1
3500	B4
3501	B4
3502	B9
3503	B11
3504	A11
3505	A11
3506	B9
3507	F14
3508	B11
3509	B11
3511	C6
3512	C6
3513	A10
3514	C6
3515	C6
3516	C6
3517	C12
3519	C9
3520	C11
3521	C12
3522	C12
3523	C12
3524	D14
3525	E14
3526	F2
3534	I12
3535	I13
3537	I12
3538	I13
3540	C9
3541	B7
3542	B8
3545	D14
3546	C7
3547	B6
3548	A10
3550	B10
3551	B10
3553	A11
3562	C7
3563	C7
3564	C8
3566	C7
3568	C8
3570	F14
3571	A2
3572	B2
4500	A9
4501	A9
4502	B7
4503	C8
4504	C10
4505	C6
4506	C7
4507	B10
5501	I11
5502	I12
5503	A1
5504	B1
7503	D2
7505	A3
F501	A11
F502	C7
F503	I13
F504	C7
F505	C12
F506	D14
F507	F14
F508	C7
F509	C8
F511	A1
F512	B1
F513	B11
F514	B8
F515	B1
F516	B1
F517	B11
F518	B6
F519	A9
F520	C8
F521	C10
F522	C11
F524	C10
F525	C11
F526	C7
F527	C7
F528	C11
F529	C8
F530	C10
F531	C10
F532	C10
F533	C10
F534	C10
F535	C5
F536	C6
F537	C11
F538	C6
F539	C7
F540	C6
F541	C12
F542	C9
F543	C7
F544	C9
F545	C9
F546	C9
F547	C9
F548	C9
F549	C9
F552	C7
F553	C8
F554	C8
F555	C6
F556	C12
F557	C12
F558	D14
F559	E14
F560	E14
F562	E14
F564	E14
F566	F14
F567	F14
F568	F2
F569	F13
F573	F14
F574	G14
F576	G14
F578	G2
F579	G2
F580	G2
F581	G2
F582	G2
F583	G2
F585	H11
F586	H11
F587	H13
F588	H12
F589	H12
F590	H13
F592	I8
F593	I8
F594	I8
F595	I8
F596	I8
F597	I8
F598	I8
F599	I8

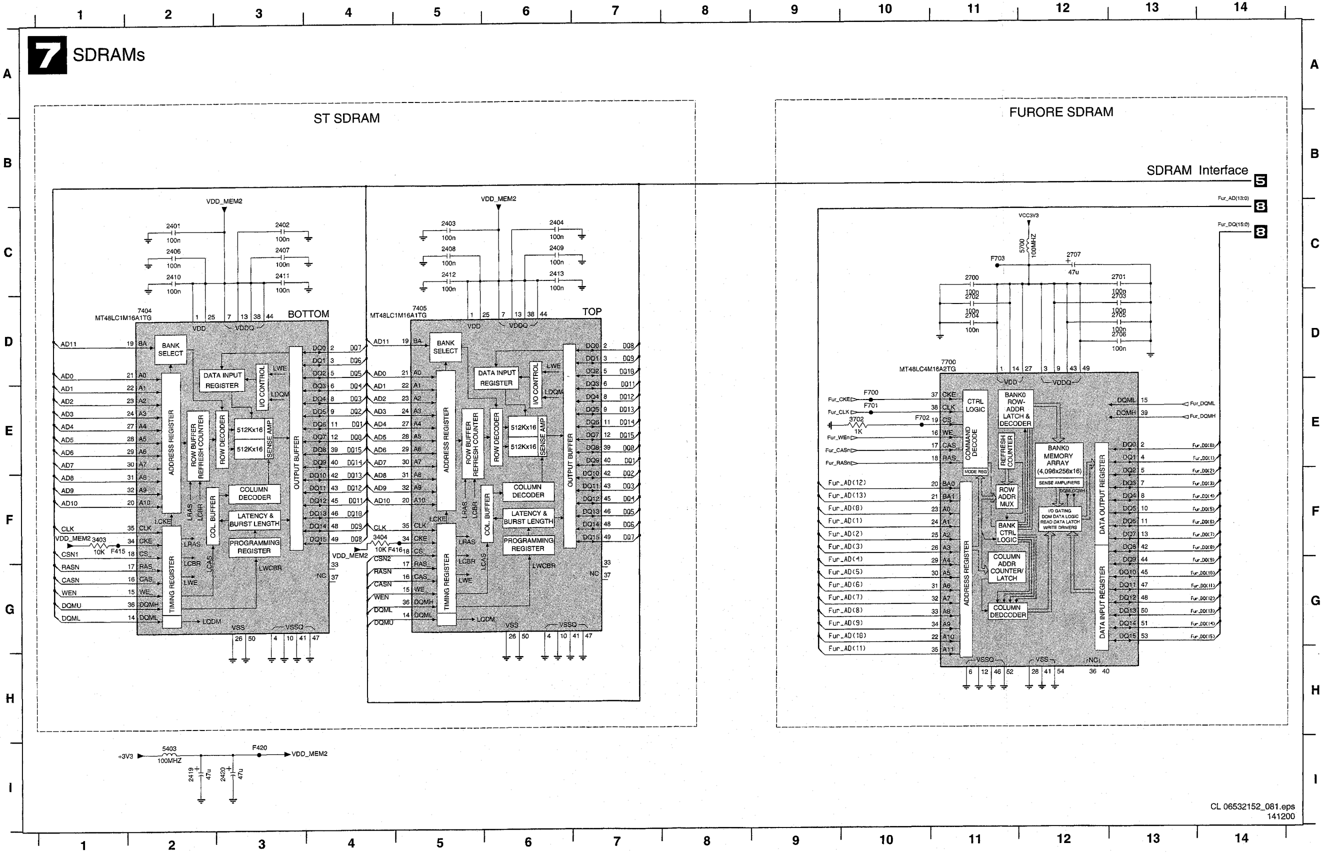
Mono Board: Power Supply & Output Interfaces


6
PWR SUPPLY + OUTPUT INTERFACES
5 SERIAL PC INTERFACE
SERVICE
TXD_SER
RXD_SER
RTS_SER
CTS_SER
7600-A 74HCT14D
7600-B 74HCT14D
7600-C 74HCT14D
7600-D 74HCT14D
7600-E 74HCT14D
7600-F 74HCT14D
TO/FROM PC INTERFACE
FROM SUPPLY
1600
5609 100MHZ BLM31
7622 LD1117
7605 LD1117
IN OUT GND
+3V3
VCC3V3
+3V3S
VCC5V
+5V
+5Vstby
+6Vstby
-8Vstby
+12Vstby
STB_CONT
PWR_FAIL
VDD_STI
SCART1
SCART0
MUTE
kar_by_pass
centre_on
P50
7604 BC847B
7607 BC847B
7608 BC857B
7609 BC857B
7610 BC847B
1PS76SB10
STB_MUTE
MUTE_AV
OPTION
0_6_12V
FMN
SCLKo
PCM_OUTO
LRCLKo
SPDIF_OUT
SCLK_Fur
PCM_LeRi_Fur
LRCLK_Fur
SPDIF_Fur
SCLK_AV
PCMOUT_AV
PCMCLK_AV
LRCLK_AV
SPDIF_AV
7611 74HCT1G125
5601 100MHZ
5610 100MHZ BLM31
R_OUT
G_OUT
B_OUT
CVBS_OUT
C_OUT
Y_OUT
7612 BC847B
7613 BC847B
7614 BC847B
7615 BC847B
7617 BC847B
7616 BC847B
-Vvid
R_VID
G_VID
B_VID
CVBS
C_VID
Y_VID
SCLK
LRCLK
TO AUDIO / VIDEO MUX. BOARD
1604
HSYNC
PCM_CeLf_Fur
SCL
SDA
TO AUDIO/VIDEO MUX. BOARD
1605 CFLG
1606
1607 B_FLAG
1608 MEAS1
7620 BC857B
7621 BC817-25
(SCLKo,PCM_OUTO,LRCLKo,SPDIF_OUT,R_OUT,G_OUT,B_OUT,C_OUT,CVBS_OUT,Y_OUT)
1 2 3 4 5 6 7 8 9 10 11 12 13
A B C D E F G H I

CL 06532152_080.eps
141200

1600	C1
1602-1	A13
1602-2	A13
1602-3	A13
1602-4	B13
1602-5	B13
1602-6	B13
1602-7	A13
1603-1	E13
1603-10	C13
1603-11	C13
1603-12	D13
1603-13	D13
1603-14	E13
1603-15	E13
1603-16	E13
1603-17	D13
1603-18	E13
1603-19	E13
1603-2	F13
1603-20	D13
1603-21	E13
1603-22	D13
1603-3	F13
1603-4	D13
1603-5	F13
1603-6	G13
1603-7	D13
1603-8	C13
1603-9	C13
1604	G13
1605	G1
1606	G1
1607	G1
1608	H1
2600	A11
2601	A12
2602	B12
2603	B1
2604	D3
2605	C8
2606	C9
2607	E2
2608	C3
2609	D1
2610	E7
2611	G2
2614	F9
2615	F9
2616	G9
2617	G9
2620	G9
2621	G9
2622	H8
2623	H9
2624	I8
2625	I9
2626	I8
2627	I9
2632	C8
2633	C8
2634	D2
2635	D2
2636	D3
2637	E2
2638	E3
2639	E4
2640	F11
2641	F11
2642	F12
2643	F12
2644	F12
2645	F13
2646	B3
2647	H11
2648	H12
2649	B2
2650	C2
3606	C10
3607	A12
3608	B11
3609	B12
3610	A12
3611	B12
3612	B6
3613	B6
3614	C6
3615	C10
3616	D12
3617	D11
3618	D8
3619	D9
3620	A12
3621	B12
3622	C9
3623	E10
3624	E10
3625	E11
3626	F10
3627	B7
3628	B7
3629	C10
3630	B7
3631	F9
3632	F10
3633	G8
3635	A12
3636	B12
3637	C11
3642	B6
3647	G8
3648	H8
3651	I8
3654	I8
3655	I9
3656	I9
3657	H9
3658	I10
3659	I10
3660	H10
3661	G9
3662	G10
3663	G10
3664	G10
3665	E10
3667	E10
3672	E3
3674	D10
3676	E7
3686	H1
3687	I1
3688	I2
3689	I3
3690	I3
3691	D5
4602	E5
4603	E5
4604	E5
5600	A12
5601	E6
5602	F9
5604	F9
5605	G9
5606	H9
5607	I9
5608	I9
5609	B2
5610	F2
5611	D3
6600	C9
7600-A	A11
7600-B	B11
7600-C	A11
7600-D	B11
7600-E	A9
7600-F	A8
7604	B7
7605	C2
7607	B6
7608	C10
7609	C10
7610	D10
7611	F6
7612	F10
7613	F10
7614	G10
7615	H10
7617	I10
7618	I9
7620	H2
7621	I3
7622	B2
F600	A13
F601	A13
F602	A13
F603	A12
F604	B3
F605	C1
F606	A12
F607	A13
F608	C3
F609	B6
F610	B7
F611	B13
F612	B12
F613	B12
F614	D2
F615	D2
F616	B13
F617	B7
F618	E2
F619	C10
F620	C12
F621	C6
F622	C10
F623	E2
F624	C9
F625	C12
F626	D10
F627	F3
F628	E7
F629	D9
F630	D12
F631	D2
F632	B3
F633	E12
F634	E3
F635	E11
F636	E2
F637	E11
F638	E11
F639	E8
F640	E11
F641	E11
F643	F10
F644	E11
F646	F11
F647	F9
F648	F10
F649	F11
F651	G9
F652	G9
F653	G11
F654	H8
F655	H9
F656	H13
F657	H11
F658	H13
F659	H13
F660	I8
F661	I9
F662	I10
F663	I8
F664	I9
F665	I12
F669	C11
F670	E2
F671	I1
F672	I2
F673	I2
F674	I3
F675	F2
F921	A13
F922	A13
F923	A13
F924	A13
F925	B13
F926	B13
F927	G2
F928	G2
F929	H2

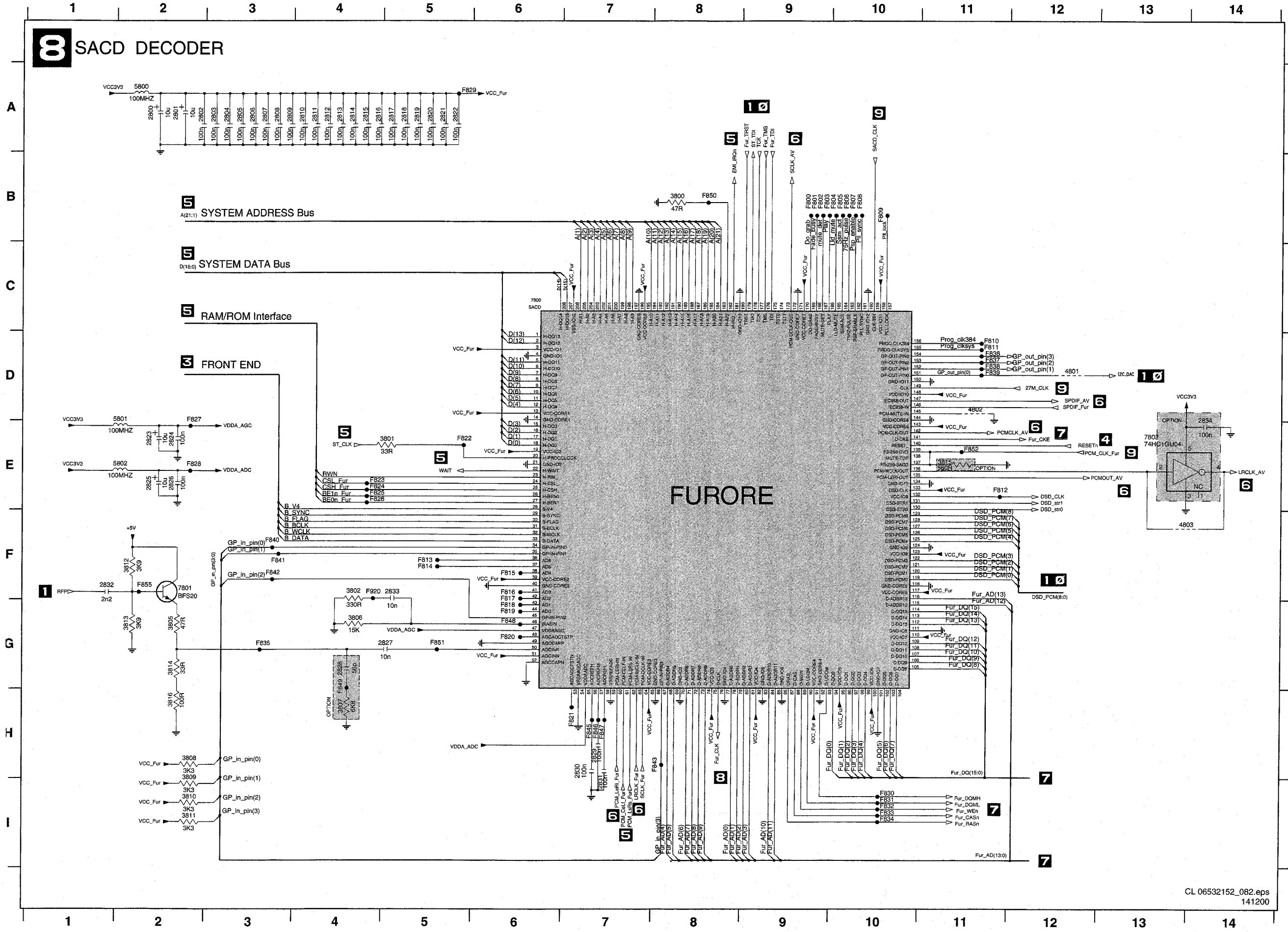
Mono Board: SD RAM s


7 SDRAMs
ST SDRAM
FURORE SDRAM
SDRAM Interface
5
8
8
Fur_AD(13:0)
Fur_DQ(15:0)
VDD_MEM2
7404
MT48LC1M16A1TG
BOTTOM
7405
MT48LC1M16A1TG
TOP
7700
MT48LC4M16A2TG
VCC3V3
5700
100MHZ
2707
47u
F703
2401 100n
2402 100n
2403 100n
2404 100n
2406 100n
2407 100n
2408 100n
2409 100n
2410 100n
2411 100n
2412 100n
2413 100n
2700 100n
2701 100n
2702 100n
2703 100n
2704 100n
2705 100n
2706 100n
BANK SELECT
DATA INPUT REGISTER
I/O CONTROL
ADDRESS REGISTER
ROW BUFFER REFRESH COUNTER
ROW DECODER
512Kx16
SENSE AMP
OUTPUT BUFFER
COLUMN DECODER
LATENCY & BURST LENGTH
PROGRAMMING REGISTER
COL. BUFFER
TIMING REGISTER
CTRL LOGIC
COMMAND DECODE
MODE REG
BANK0 ROW-ADDR LATCH & DECODER
REFRESH COUNTER
BANK0 MEMORY ARRAY (4,096x256x16)
SENSE AMPLIFIERS
ROW ADDR MUX
BANK CTRL LOGIC
I/O GATING DQM DATA LOGIC READ DATA LATCH WRITE DRIVERS
COLUMN ADDR COUNTER/ LATCH
COLUMN DEDCODER
DATA OUTPUT REGISTER
DATA INPUT REGISTER
VDD
VDDQ
VSS
VSSQ
NC
AD0 … AD11
CLK
CSN1
CSN2
RASN
CASN
WEN
DQMU
DQML
DQ0 … DQ15
3403 10K F415
3404 10K F416
Fur_CKE
Fur_CLK
Fur_WEn
Fur_CASn
Fur_RASn
Fur_DQML
Fur_DQMH
Fur_AD(0) … Fur_AD(13)
Fur_DQ(0) … Fur_DQ(15)
F700
F701
F702
3702 1K
+3V3
5403 100MHZ
F420
2419 47u
2420 47u
A B C D E F G H I
1 2 3 4 5 6 7 8 9 10 11 12 13 14

CL 06532152_081.eps
141200

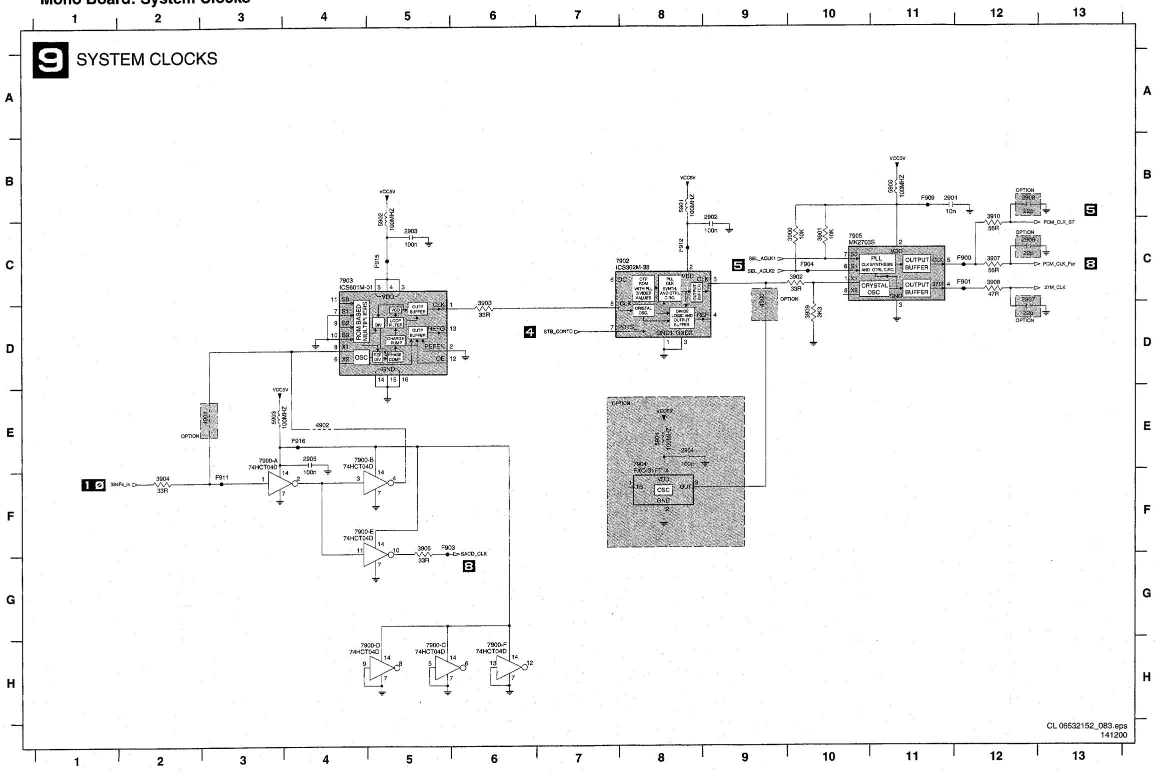
2401	C2
2402	C3
2403	C5
2404	C6
2406	C2
2407	C3
2408	C5
2409	C6
2410	C2
2411	C3
2412	C5
2413	C6
2419	I2
2420	I3
2700	C11
2701	C13
2702	D11
2703	D13
2704	D11
2705	D13
2706	D13
2707	C12
3403	F1
3404	F4
3702	E10
5403	I2
5700	C12
7404	D2
7405	D5
7700	D11
F415	F1
F416	F4
F420	I3
F700	E10
F701	E10
F702	E10
F703	C11

Mono Board: SACD Decoder


8 SACD DECODER
FURORE
7800 SACD
SYSTEM ADDRESS Bus A(21:1)
SYSTEM DATA Bus D(15:0)
RAM/ROM Interface
FRONT END
VCC3V3
5800 100MHZ
F829 VCC_Fur
5801 100MHZ F827 VDDA_AGC
5802 100MHZ F828 VDDA_ADC
3800 47R F850
3801 33R F822 ST_CLK WAIT
7801 BFS20
2832 2n2 F855 RFP
3812 3K9
3813 3K9
3805 47R
3814 33R
3816 100R
3802 330R F920 2833 10n
3806 15K VDDA_AGC
F835 2827 10n F851
3807 6K8 F849 2828 56p OPTION
3808 3K3 GP_in_pin(0)
3809 3K3 GP_in_pin(1)
3810 3K3 GP_in_pin(2)
3811 3K3 GP_in_pin(3)
VDDA_ADC
EMI_IRQn
Fur_TRST ST_TDI TCK Fur_TMS Fur_TDI
SCLK_AV
SACD_CLK
Pll_lock F809
Prog_clk384 F810
Prog_clksys F811
F836 GP_out_pin(3)
F837 GP_out_pin(2)
F838 GP_out_pin(1)
F839 GP_out_pin(0)
4801 I2C_DAC
27M_CLK
SPDIF_AV SPDIF_Fur
4802
PCMCLK_AV
Fur_CKE
RESETn
PCM_CLK_Fur
F852
3815 560R OPTION
PCMOUT_AV
F812
DSD_CLK DSD_str1 DSD_str0
DSD_PCM(8) DSD_PCM(7) DSD_PCM(6) DSD_PCM(5) DSD_PCM(4)
DSD_PCM(3) DSD_PCM(2) DSD_PCM(1) DSD_PCM(0)
DSD_PCM(8:0)
Fur_AD(13) Fur_AD(12)
Fur_DQ(15) Fur_DQ(14) Fur_DQ(13) Fur_DQ(12) Fur_DQ(11) Fur_DQ(10) Fur_DQ(9) Fur_DQ(8)
Fur_DQ(15:0)
F830 Fur_DQMH
F831 Fur_DQML
F832 Fur_WEn
F833 Fur_CASn
F834 Fur_RASn
Fur_AD(13:0)
VCC3V3 OPTION 2834 100n
7802 74HC1GU04
LRCLK_AV
4803
RWN CSL_Fur CSH_Fur BE1n_Fur BE0n_Fur
F823 F824 F825 F826
B_V4 B_SYNC B_FLAG B_BCLK B_WCLK B_DATA
GP_in_pin(0) GP_in_pin(1) F840 F841
GP_in_pin(2) F842
F813 F814 F815 F816 F817 F818 F819 F848 F820
F821 F845 F846 F847 F843
2829 100n 2830 100n 2831 100n
PCM_LsRs_Fur PCM_CsLf_Fur PCM_LsRs_Fur LRCLK_Fur SCLK_Fur
Fur_CLK
F800 F801 F802 F803 F804 F805 F806 F807 F808
Dc_grab Fade_busy mute_det Halt Lid_mute Ssm_act 75Hz_pulse Pll_enable Pll_sync
CL 06532152_082.eps
141200

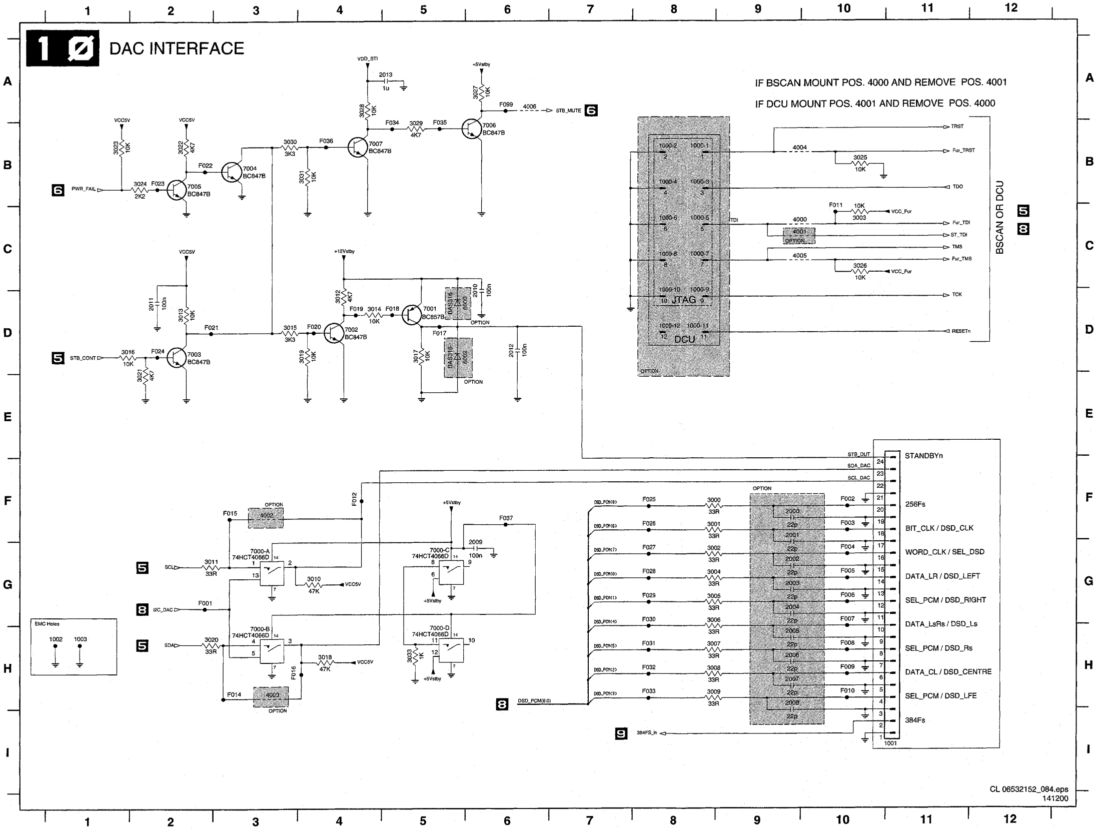
2800	A2
2801	A2
2802	A2
2803	A3
2804	A3
2805	A3
2806	A3
2807	A3
2808	A3
2809	A3
2810	A4
2811	A4
2812	A4
2813	A4
2814	A4
2815	A4
2816	A4
2817	A5
2818	A5
2819	A5
2820	A5
2821	A5
2822	A5
2823	E2
2824	E2
2825	E2
2826	E2
2827	G5
2828	G4
2829	H7
2830	H7
2831	I7
2832	F1
2833	F5
2834	E14
3800	B8
3801	E5
3802	F4
3805	G2
3806	G4
3807	H4
3808	H2
3809	I2
3810	I2
3811	I2
3812	F2
3813	G2
3814	G2
3815	E11
3816	H2
4801	D12
4802	D11
4803	F13
5800	A2
5801	E2
5802	E2
7800	C6
7801	F2
7802	E13
F800	B9
F801	B9
F802	B9
F803	B9
F804	B10
F805	B10
F806	B10
F807	B10
F808	B10
F809	B10
F810	D11
F811	D11
F812	E11
F813	F5
F814	F5
F815	F6
F816	F6
F817	G6
F818	G6
F819	G6
F820	G6
F821	H7
F822	E5
F823	E4
F824	E4
F825	E4
F826	E4
F827	E2
F828	E2
F829	A5
F830	I10
F831	I10
F832	I10
F833	I10
F834	I10
F835	G3
F836	D11
F837	D11
F838	D11
F839	D11
F840	F3
F841	F3
F842	F3
F843	H8
F845	H7
F846	H7
F847	H7
F848	G6
F849	G4
F850	B8
F851	G5
F852	E11
F855	F2
F920	F4

Mono Board: System Clocks


9 SYSTEM CLOCKS
1 2 3 4 5 6 7 8 9 10 11 12 13
A B C D E F G H
VCC5V
5902 100MHZ
2903 100n
F915
7903 ICS601M-01
VDD
S0 S1 S2 S3 X1 X2
ROM BASED MULTIPLIERS
DIV
VCO
LOOP FILTER
CHARGE PUMP
OUTP BUFFER
OSC
REF DIV
PHASE COMP
CLK REFO PSTEN OE
GND
3903 33R
7902 ICS302M-38
DC ICLK PDTS
OTP ROM WITH PLL DIVIDER VALUES
PLL CLK SYNTH. AND CTRL CIRC.
CRYSTAL OSC.
DIVIDE LOGIC AND OUTPUT BUFFER
VDD CLK REF GND1 GND2
5901 100MHZ
2902 100n
F912
STB_CONTD
4
5
SEL_ACLK1
SEL_ACLK2
F904
3900 10K
3901 10K
3902 33R
3909 3K3
4900 OPTION
5900 100MHZ
F909
2901 10n
7905 MK2703S
PLL CLK SYNTHESIS AND CTRL CIRC.
CRYSTAL OSC
OUTPUT BUFFER
VDD CLK 27M GND
F900
F901
3910 56R
3907 56R
3908 47R
OPTION 2908 22p
OPTION 2906 22p
2907 22p OPTION
PCM_CLK_ST
PCM_CLK_Fur
27M_CLK
8
OPTION
VCC5V
5904 100MHZ
2904 100n
7904 FXO-31FT
TS VDD OSC OUT GND
4901 OPTION
VCC5V
5903 100MHZ
4902
F916
1 0
384Fs_in
3904 33R
F911
7900-A 74HCT04D
2905 100n
7900-B 74HCT04D
7900-E 74HCT04D
3906 33R
F903
SACD_CLK
8
7900-D 74HCT04D
7900-C 74HCT04D
7900-F 74HCT04D
CL 06532152_083.eps
141200

2901	B11
2902	C9
2903	C5
2904	E8
2905	E4
2906	C12
2907	D12
2908	B12
3900	C10
3901	C10
3902	C10
3903	D6
3904	F2
3906	F5
3907	C12
3908	C12
3909	D10
3910	C12
4900	C9
4901	E3
4902	E4
5900	B11
5901	B8
5902	B5
5903	E3
5904	E8
7900-A	E3
7900-B	E4
7900-C	H5
7900-D	H4
7900-E	F4
7900-F	H6
7902	C7
7903	C4
7904	E8
7905	C10
F900	C12
F901	C12
F903	F5
F904	C10
F909	B11
F911	F3
F912	C8
F915	C5
F916	E4

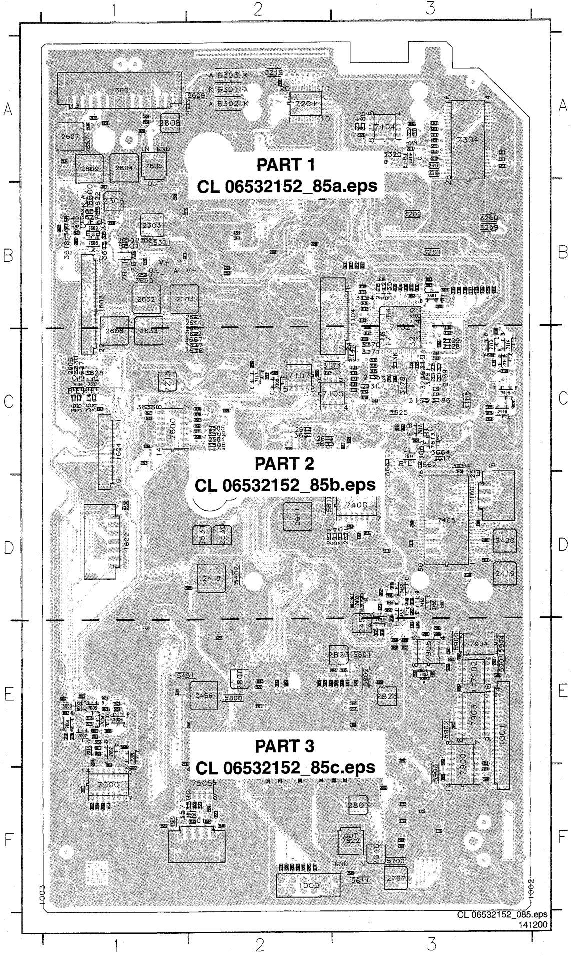
Mono Board: DAC Interface


1 Ø DAC INTERFACE
IF BSCAN MOUNT POS. 4000 AND REMOVE POS. 4001
IF DCU MOUNT POS. 4001 AND REMOVE POS. 4000
BSCAN OR DCU
JTAG
DCU
OPTION
PWR_FAIL
STB_CONT
STB_MUTE
VDD_STI
+5Vstby
+12Vstby
VCC5V
7004 BC847B
7005 BC847B
7007 BC847B
7006 BC847B
7003 BC847B
7002 BC847B
7001 BC857B
BAS316 6000
BAS316 6002
TRST
Fur_TRST
TDO
Fur_TDI
ST_TDI
TMS
Fur_TMS
TCK
RESETn
VCC_Fur
7000-A 74HCT4066D
7000-B 74HCT4066D
7000-C 74HCT4066D
7000-D 74HCT4066D
SCL
SDA
I2C_DAC
EMC Holes
1002
1003
DSD_PCM(8:0)
384FS_in
STB_OUT
SDA_DAC
SCL_DAC
STANDBYn
256Fs
BIT_CLK / DSD_CLK
WORD_CLK / SEL_DSD
DATA_LR / DSD_LEFT
SEL_PCM / DSD_RIGHT
DATA_LsRs / DSD_Ls
SEL_PCM / DSD_Rs
DATA_CL / DSD_CENTRE
SEL_PCM / DSD_LFE
384Fs
1001
1 2 3 4 5 6 7 8 9 10 11 12
A B C D E F G H I

CL 06532152_084.eps
141200

1000-1	B8
1000-10	D8
1000-11	D8
1000-12	D8
1000-2	B8
1000-3	B8
1000-4	B8
1000-5	C8
1000-6	C8
1000-7	C8
1000-8	C8
1000-9	D8
1001	I10
1002	H1
1003	H1
2000	F9
2001	F9
2002	G9
2003	G9
2004	G9
2005	H9
2006	H9
2007	H9
2008	H9
2009	G6
2010	D6
2011	D2
2012	D6
2013	A5
3000	F8
3001	F8
3002	G8
3003	C10
3004	G8
3005	G8
3006	G8
3007	H8
3008	H8
3009	H8
3010	G4
3011	G2
3012	D4
3013	D2
3014	D4
3015	D3
3016	D1
3017	D5
3018	H4
3019	D4
3020	H2
3021	E2
3022	B2
3023	B1
3024	B2
3025	B10
3026	C10
3027	A6
3028	A4
3029	B5
3030	B3
3031	B4
3033	H5
4000	C9
4001	C9
4002	F3
4003	H3
4004	B9
4005	C9
4006	A6
6000	D5
6002	D5
7000-A	G3
7000-B	H3
7000-C	G5
7000-D	H5
7001	D5
7002	D4
7003	D2
7004	B3
7005	B2
7006	B6
7007	B4
F001	G2
F002	F10
F003	F10
F004	G10
F005	G10
F006	G10
F007	G10
F008	H10
F009	H10
F010	H10
F011	C10
F012	F4
F014	H3
F015	F3
F016	H3
F017	D5
F018	D5
F019	D4
F020	D4
F021	D2
F022	B2
F023	B2
F024	D2
F025	F8
F026	F8
F027	G8
F028	G8
F029	G8
F030	G8
F031	H8
F032	H8
F033	H8
F034	B5
F035	B5
F036	B4
F037	F6
F099	A6

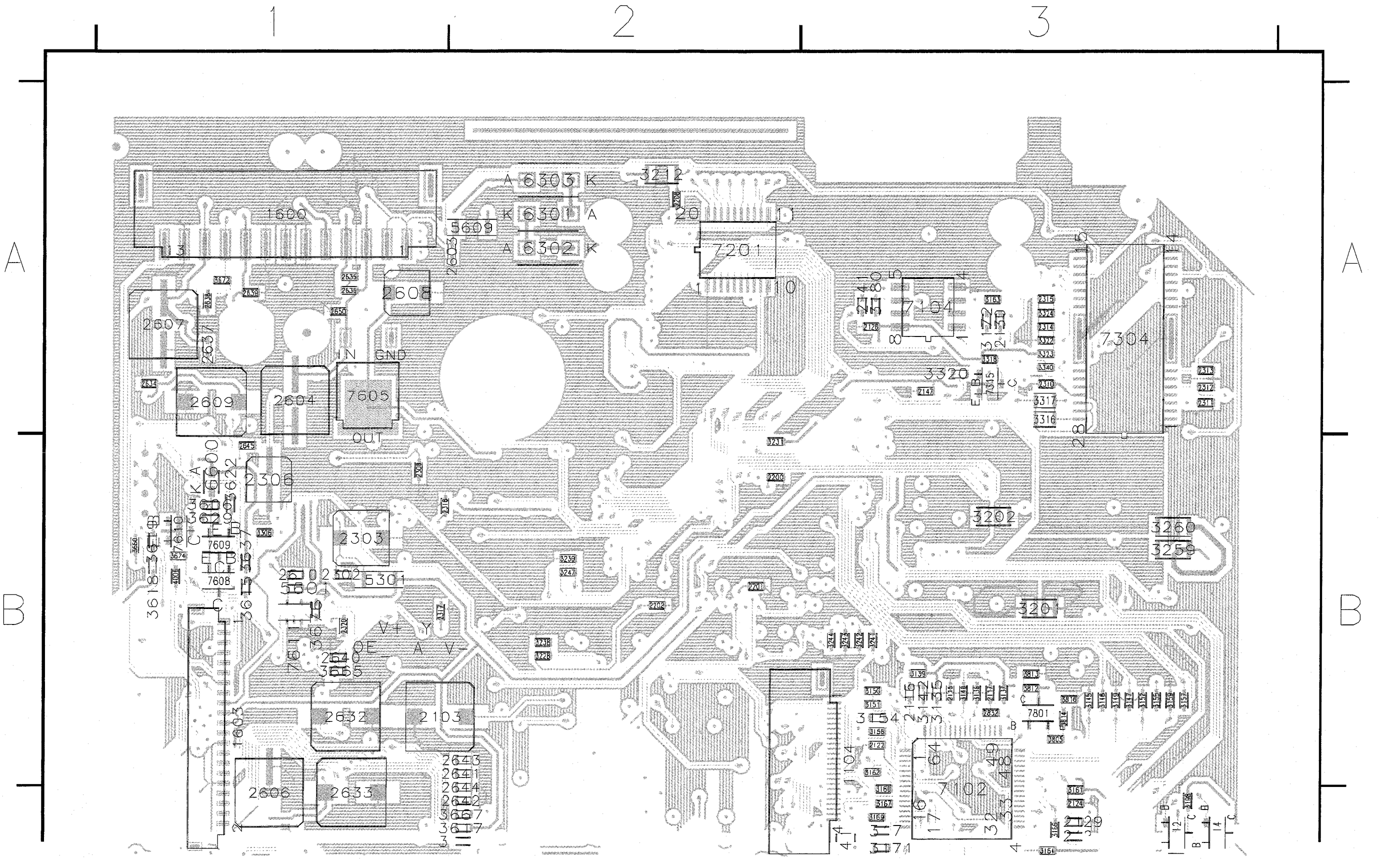
Layout Mono Board: (Overview Top Side)



CL 06532152_085.eps
141200

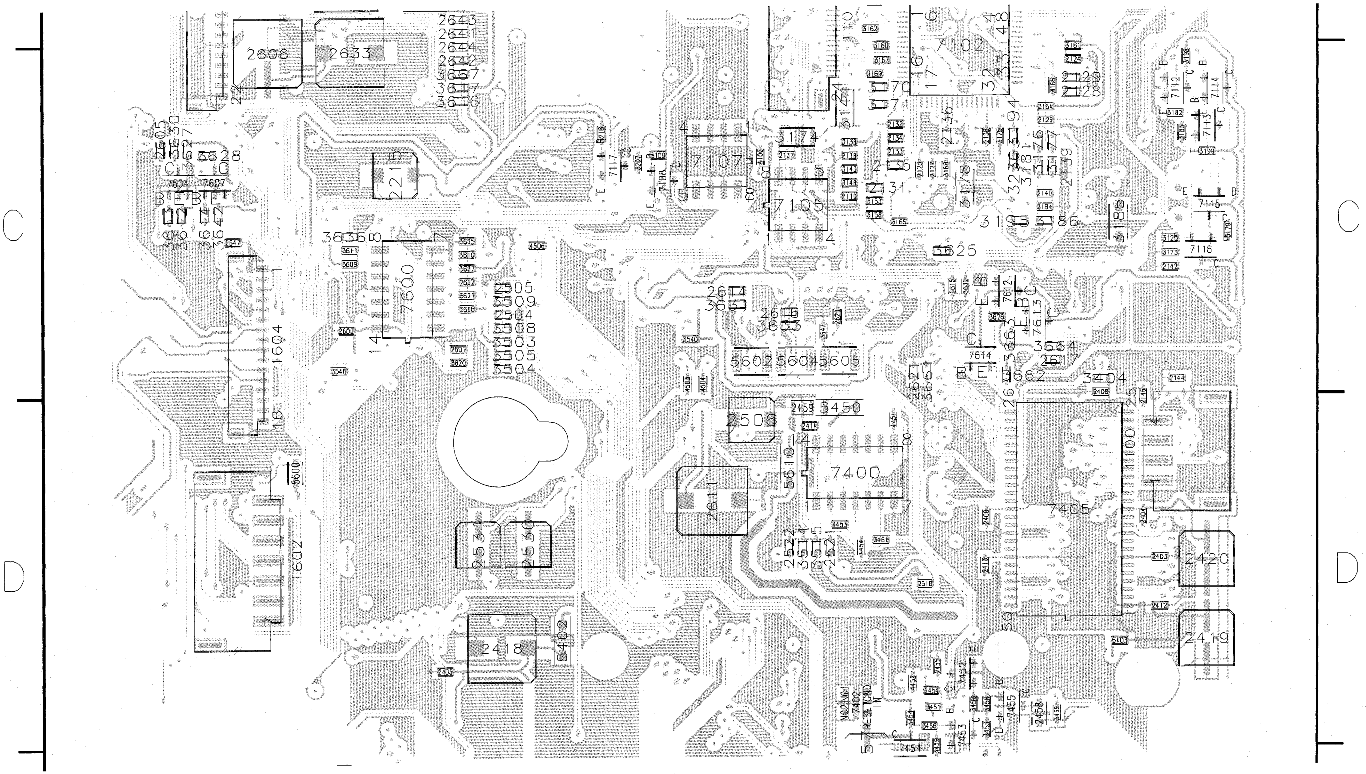
1001	E3	2642	C2	3180	A3	3910	E3
1100	D3	2643	B2	3181	C3	4000	F2
1104	B3	2644	C2	3182	C3	4001	F2
1501	F2	2645	B1	3183	C3	4002	F1
1600	A1	2646	F3	3184	C3	4003	F1
1602	D1	2647	C1	3185	C3	4004	F2
1603	B1	2649	F3	3186	C3	4005	F2
1604	C1	2650	A1	3194	C3	4006	B1
2009	E1	2700	E3	3195	C3	4100	C2
2010	E1	2701	F3	3198	C3	4450	E1
2011	E1	2702	F3	3199	C3	4451	D3
2012	E1	2703	F3	3201	B3	4452	D3
2013	E1	2704	F3	3202	B3	4453	D3
2103	B1	2705	F3	3207	C2	4454	D3
2115	B3	2706	F3	3212	A2	4500	E3
2116	B3	2707	F3	3216	C2	4501	E3
2117	B3	2800	E2	3228	B2	4502	E3
2118	C3	2801	F3	3231	B2	4503	C2
2119	C3	2802	E2	3236	C3	4504	C2
2122	B3	2803	E2	3238	B2	4506	C2
2123	C3	2804	E2	3239	B2	4604	F2
2124	C3	2805	E2	3241	B3	4803	E3
2125	C3	2806	E3	3242	B3	4900	E3
2126	A3	2807	E3	3243	B3	4901	F3
2127	C3	2808	E3	3244	B3	4902	E3
2128	C3	2809	E3	3247	B2	5301	B1
2129	C3	2810	E3	3259	B3	5402	D2
2130	A3	2811	F3	3260	B3	5403	D3
2131	C3	2812	F3	3306	B1	5450	D3
2132	C3	2813	F3	3316	A3	5451	E1
2133	C3	2814	F3	3317	A3	5503	F1
2134	C3	2815	F2	3318	A3	5504	F2
2135	C3	2816	F2	3320	A3	5600	D1
2136	C3	2817	F2	3322	A3	5601	B1
2137	C2	2818	F2	3323	A3	5602	C2
2138	C3	2819	F2	3324	A3	5604	C3
2139	C3	2820	E2	3340	A3	5605	C3
2140	C3	2821	E2	3404	C3	5609	A2
2141	A3	2822	E2	3451	D3	5610	D2
2142	C3	2823	E3	3452	D3	5611	F3
2144	C3	2824	E3	3453	D3	5700	F3
2145	D3	2825	E3	3454	D3	5800	E2
2147	A3	2826	E3	3455	D3	5801	E3
2200	B2	2832	B3	3456	D3	5802	E3
2201	B2	2833	E3	3457	E3	5900	E3
2202	B2	2834	E3	3458	D3	5901	E3
2208	A2	2901	E3	3459	E3	5902	E3
2215	C1	2902	E3	3460	E3	5903	F3
2302	B1	2903	E3	3461	D3	5904	E3
2303	B1	2904	E3	3500	F2	6000	E1
2306	B1	2905	F3	3501	F2	6002	E1
2308	B1	2906	E3	3503	C2	6301	A2
2310	A3	2907	E3	3504	C2	6302	A2
2311	A3	2908	E3	3505	C2	6303	A2
2312	A3	3003	F2	3508	C2	6600	B1
2313	A3	3010	F1	3509	C2	7000	F1
2314	A3	3011	F1	3514	D3	7001	E1
2315	A3	3012	E1	3515	D3	7002	E1
2316	B1	3013	E1	3540	C2	7003	E1
2317	B1	3014	E1	3548	C1	7004	E1
2320	B1	3015	E1	3553	F2	7005	E1
2403	D3	3016	E1	3571	F1	7006	E1
2404	D3	3017	E1	3572	F2	7007	E1
2405	D2	3018	E1	3606	B1	7102	C3
2408	C3	3019	E1	3607	C2	7104	A3
2409	D3	3021	E1	3608	C2	7105	C3
2412	D3	3022	E1	3609	C1	7107	C2
2413	D3	3023	E1	3610	C2	7108	C2
2414	D3	3024	E1	3611	C1	7112	C3
2418	D2	3025	F2	3612	C1	7113	C3
2419	D3	3026	F2	3613	C1	7114	C3
2420	D3	3027	F1	3614	C1	7115	C3
2450	E1	3028	E1	3615	B1	7116	C3
2451	E2	3029	E1	3616	C2	7117	C2
2452	E2	3030	E1	3617	C2	7201	A2
2453	E1	3031	E1	3618	B1	7304	A3
2454	D3	3033	E1	3619	B1	7315	A3
2455	D3	3109	C2	3620	C2	7400	D3
2456	E2	3120	C3	3621	C2	7402	D3
2457	E3	3135	B3	3622	B1	7405	D3
2458	D3	3136	B3	3625	C3	7452	D3
2459	D3	3137	B3	3626	C3	7453	D3
2500	F2	3138	C3	3627	C1	7454	E3
2504	C2	3139	B3	3628	C1	7455	D3
2505	C2	3140	B3	3629	B1	7505	F2
2506	D2	3141	C3	3630	C1	7600	C1
2518	D3	3142	B3	3631	C2	7604	C1
2521	D3	3143	C3	3632	C3	7605	A1
2522	D2	3145	B3	3633	C2	7607	C1
2530	D2	3146	B3	3635	C2	7608	B1
2531	D2	3147	B3	3636	C1	7609	B1
2532	F2	3148	C3	3637	B1	7610	B1
2533	F1	3149	B3	3642	C1	7611	B1
2534	F2	3150	B3	3647	C3	7612	C3
2535	F2	3151	B3	3660	B1	7613	C3
2600	C1	3152	B3	3661	C3	7614	C3
2601	C2	3153	C3	3662	C3	7622	F3
2602	C2	3154	B3	3663	C3	7801	B3
2603	A2	3155	B3	3664	C3	7802	E3
2604	A1	3156	B3	3665	B1	7900	F3
2605	C1	3157	B3	3667	C2	7902	E3
2606	C1	3158	C3	3672	A1	7903	E3
2607	A1	3159	B3	3674	B1	7904	E3
2608	A1	3160	C3	3676	B1	7905	E3
2609	A1	3161	C3	3702	F3		
2610	B1	3162	B3	3802	E3		
2611	D2	3163	A3	3805	B3		
2614	C2	3164	C3	3806	E3		
2615	C3	3165	C3	3808	E2		
2616	C2	3166	C3	3809	E2		
2617	C3	3167	C3	3810	E3		
2620	C3	3168	C3	3811	E3		
2621	C3	3169	C3	3812	B3		
2632	B1	3170	C3	3813	B3		
2633	C1	3171	C3	3814	B3		
2634	A1	3172	A3	3816	B3		
2635	A1	3173	C3	3902	E3		
2636	A1	3174	C3	3903	E3		
2637	A1	3175	C3	3904	F3		
2638	A1	3176	C3	3906	E3		
2639	A1	3177	C3	3907	E3		
2640	B1	3178	C3	3908	E3		
2641	B2	3179	C3	3909	E3		

Layout Mono Board: (Part 1 Top Side)


1
2
3
A
B
1600
13
6303
6301
6302
5609
3212
7201
20
10
2607
2608
2609
2604
7605
IN
GND
OUT
2306
2303
5301
7609
7608
2632
2103
2606
2633
1603
7104
3320
7304
3202
3260
3259
3201
3154
7801
7102
64
49
48
17
16
32
33
1104
2643
2641
2644
2642
3667
3617

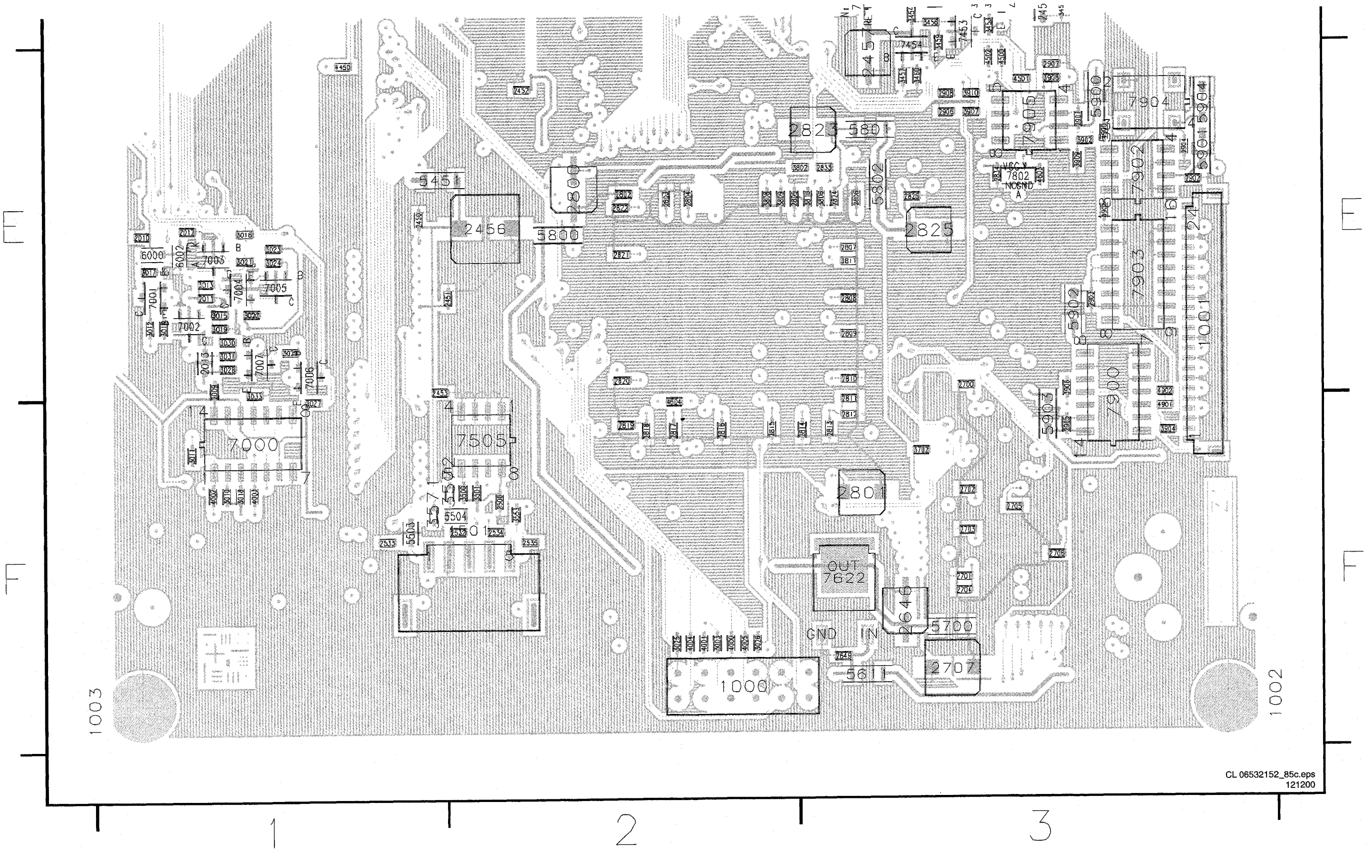
CL 06532152_85a.eps
121200

Layout Mono Board: (Part 2 Top Side)


C
D
C
D
2606
2633
2643
2641
2644
2642
3667
3617
3616
2605
3630
3627
3628
7604
7607
2210
3636
7600
2505
3509
2504
3508
3503
3505
3504
1604
1602
5600
2531
2530
2418
3402
7117
7108
7107
3174
7105
7102
3625
2611
3651
2616
3653
5602
5604
5605
7614
7612
7613
3662
3664
2617
3404
2506
5450
7400
5610
2611
7405
2420
2419
2522
3515
3521
7115
7116
7112
7114
7113
2136
2139
7452
7453
7454
7455
7402
RESET GND IN

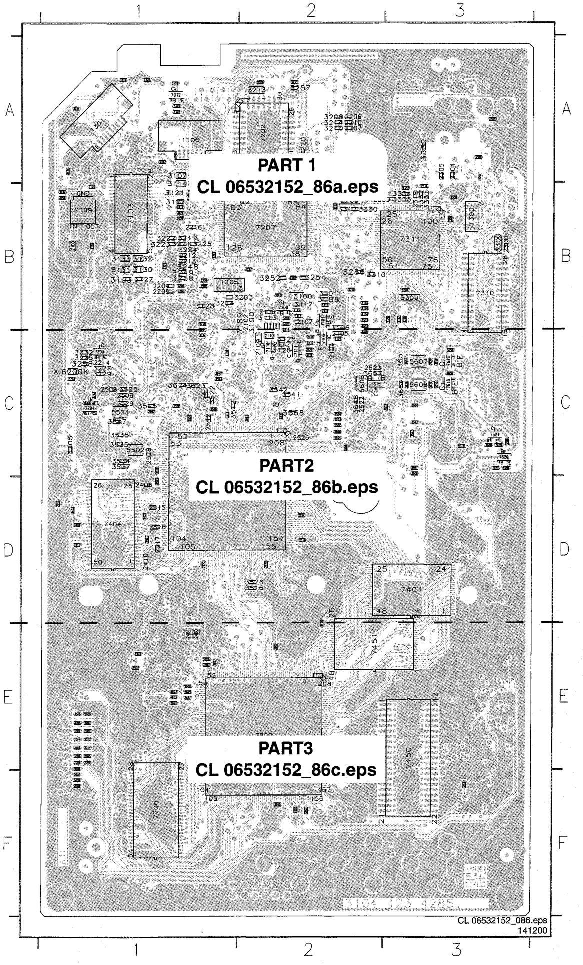
CI 06532152_85b.eps
121200

Layout Mono Board: (Part 3 Top Side)


E
F
1
2
3
2456
5800
5451
2450
2451
2453
4450
7452
7000
7505
7003
7005
7001
7002
7004
7007
7006
6000
6002
5504
5503
5502
5571
2823
5801
5802
2825
7905
7904
5900
5904
7902
7903
7900
1001
5902
5903
7802
VCC
GND
A
2801
OUT
7622
2646
5700
2707
5611
GND
IN
1000
1003
1002
7454
7453
3702
2700
2701
2704
2705
2706
2712

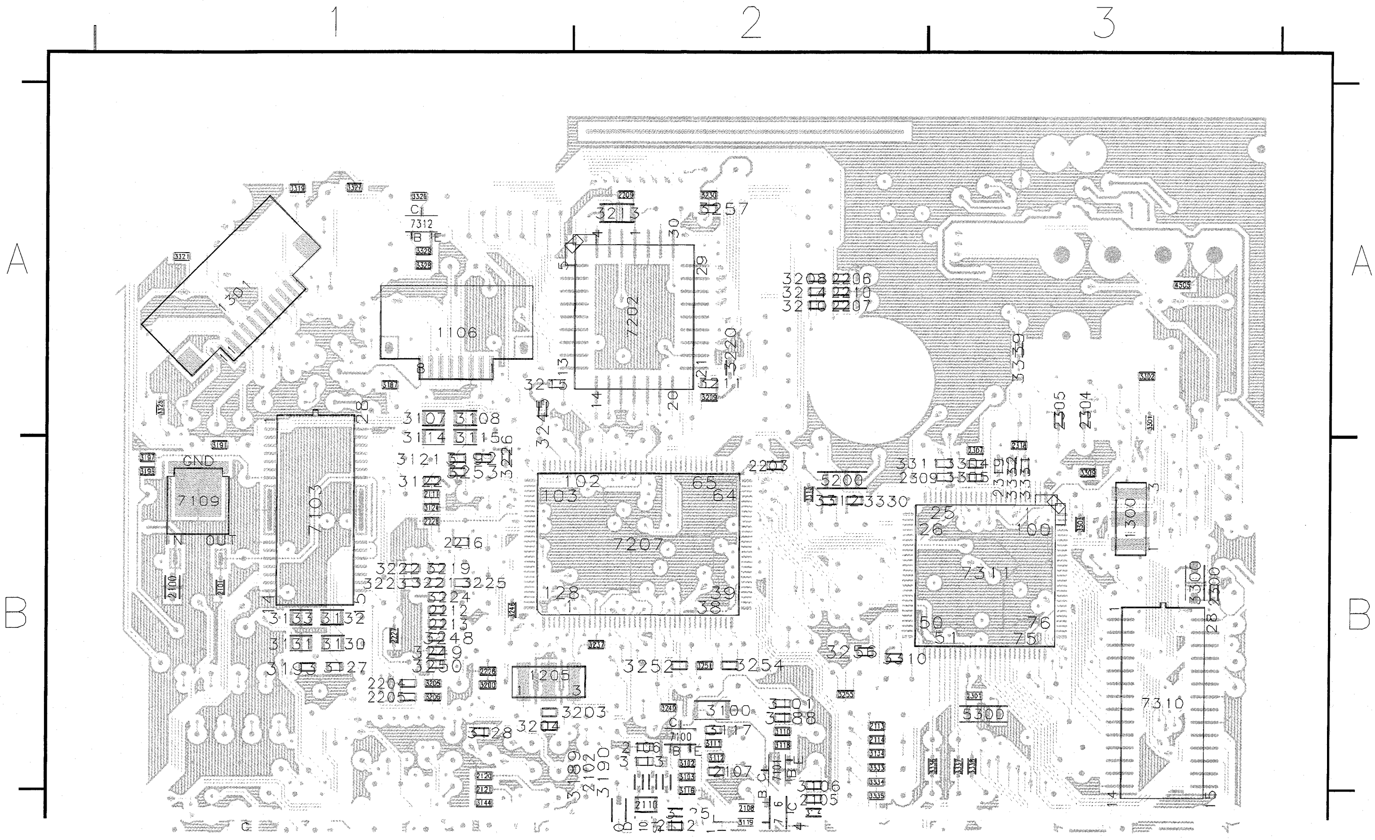
CL 06532152_85c.eps
121200

Layout Mono Board: (Overview Bottom Side)



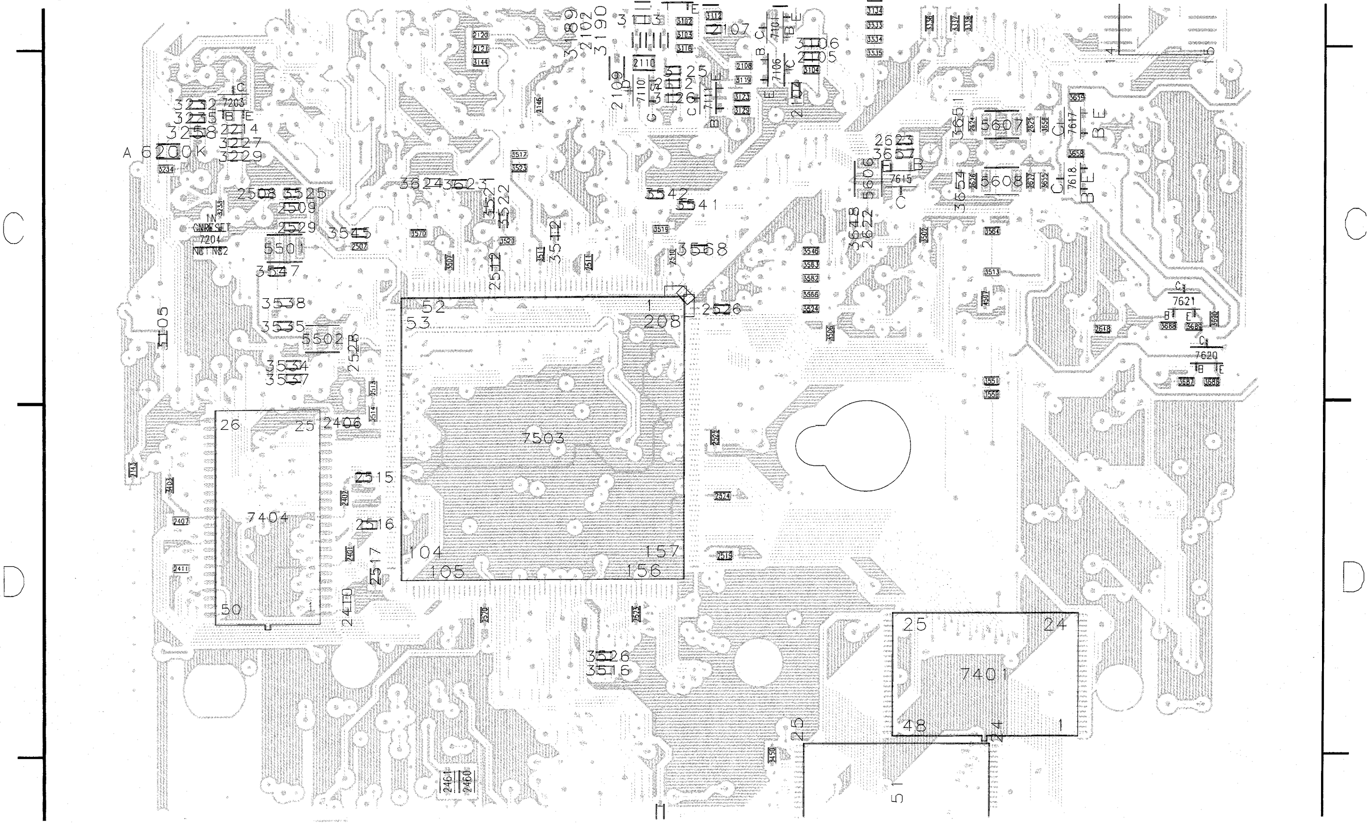
1106	A1
1205	B1
1300	B3
1301	A1
2000	E1
2001	E1
2002	E1
2003	E1
2004	E1
2005	E1
2006	E1
2007	F1
2008	F1
2100	B1
2101	B1
2102	B2
2104	C2
2105	C2
2106	B2
2107	B2
2108	C2
2109	C2
2110	C2
2111	B1
2112	C2
2113	B2
2114	B2
2120	B1
2121	C1
2143	D1
2146	C1
2203	B2
2204	B1
2205	B1
2206	A2
2207	A2
2209	A2
2210	A2
2212	B1
2213	B1
2214	C1
2216	B1
2226	B1
2227	B1
2228	B1
2300	B3
2301	B3
2304	A3
2305	A3
2307	B3
2309	B2
2318	B3
2319	B3
2401	D1
2402	D1
2406	D1
2407	D1
2410	D1
2411	D1
2460	E1
2461	E1
2507	C1
2508	C1
2509	C1
2510	C2
2511	C2
2512	C1
2513	C1
2514	D1
2515	D1
2516	D1
2517	D1
2519	D2
2520	D1
2523	D2
2524	D2
2525	D2
2526	C2
2528	C1
2529	C1
2622	C2
2623	C2
2624	C3
2625	C3
2626	C3
2627	C3
2648	C3
2827	E1
2828	E1
2829	E1
2830	E1
2831	E1
3000	E1
3001	E1
3002	E1
3004	E1
3005	E1
3006	E1
3007	E1
3008	E1
3009	F1
3020	F3
3100	B2
3101	B2
3102	B2
3103	B2
3104	C2
3105	C1
3106	B2
3107	A1
3108	A1
3110	B2
3111	B2
3112	B2
3113	B2
3114	B1
3115	B1
3116	C2
3117	B2
3118	B2
3119	C2
3121	B1
3122	B1
3123	C2
3124	B1
3125	C2
3126	C2
3127	B1
3128	B1
3129	C2
3130	B1
3131	B1
3132	B1
3133	B1
3134	B2
3144	C1
3187	A1
3188	B2
3189	B2
3190	B2
3191	B1
3192	B1
3193	B1
3196	B1
3197	B1
3200	B1
3203	B2
3204	B1
3205	B1
3206	B1
3208	A2
3209	A2
3210	A2
3211	A2
3213	A2
3214	A2
3215	A1
3219	B1
3220	A2
3221	B1
3222	B1
3223	B1
3224	B1
3225	B1
3226	B1
3227	C1
3229	C1
3230	A2
3232	C1
3233	C1
3234	C1
3235	C1
3237	B2
3240	B2
3245	A1
3246	B1
3248	B1
3249	B1
3250	B1
3251	B2
3252	B2
3253	B1
3254	B2
3255	B2
3256	B2
3257	A2
3258	C1
3300	B3
3301	A3
3302	A3
3303	B3
3304	B3
3305	B3
3309	B3
3310	B2
3311	B2
3312	B2
3313	B2
3319	A1
3321	A1
3325	A1
3326	A1
3327	A1
3328	A1
3329	A1
3330	B2
3331	B3
3332	B3
3333	B2
3334	B2
3335	C2
3336	B3
3337	B3
3338	B3
3339	A3
3403	D1
3450	E2
3502	C3
3506	C2
3507	C1
3511	C1
3512	C1
3513	C3
3516	D2
3517	C1
3519	C2
3520	C1
3521	C1
3522	C1
3523	C1
3524	C2
3525	C1
3526	D2
3534	C1
3535	C1
3537	C1
3538	C1
3541	C2
3542	C2
3545	C1
3546	C2
3547	C1
3550	C3
3551	C3
3562	C2
3563	C2
3564	C3
3566	C2
3568	C2
3570	C1
3623	C1
3624	C1
3648	C2
3651	C3
3654	C3
3655	C3
3656	C3
3657	C2
3658	C3
3659	C3
3686	C3
3687	C3
3688	C3
3689	C3
3690	C3
3691	E1
3800	E2
3801	E2
3807	E1
3815	F2
3900	E1
3901	E1
4505	A3
4507	C3
4602	E1
4603	E1
4801	F2
4802	F2
5200	B2
5300	B3
5501	C1
5502	C1
5606	C2
5607	C3
5608	C3
6200	C1
7100	B2
7101	B2
7103	B1
7106	C2
7109	B1
7110	C2
7111	C2
7202	A2
7203	C1
7204	C1
7207	B2
7310	B3
7311	B3
7312	A1
7401	D3
7404	D1
7450	E3
7451	E2
7503	D1
7615	C2
7617	C3
7618	C3
7620	C3
7621	C3
7700	F1
7800	E2

Layout Mono Board: (Part 1 Bottom Side)


1
2
3
A
B
1301
1106
7312
7202
3213
3257
3208
3214
3210
2206
2210
2207
7109
7103
GND
IN
OUT
3107
3108
3114
3115
3121
3122
2216
3222
3219
3223
3221
3225
3224
7207
102
103
65
64
128
1
38
39
2203
5200
3330
3309
7311
25
26
100
50
51
76
75
1300
7310
3133
3132
3131
3130
3193
3127
2204
2205
1205
3252
3254
3256
3310
3203
3204
3128
3100
3101
3188
3117
7100
2107
3106
3105
5300
2305
2304

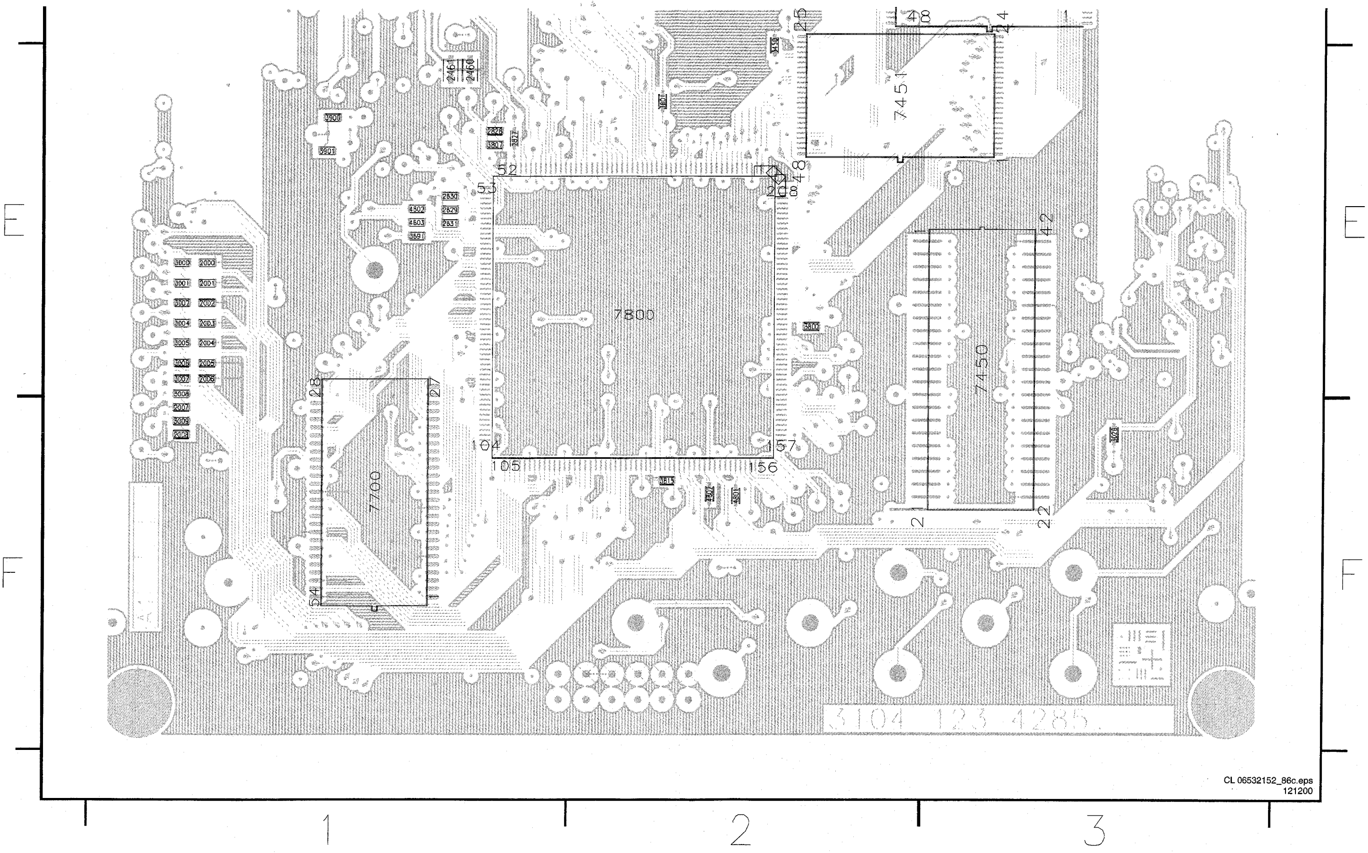
CL 06532152_86a.eps
121200

Layout Mono Board: (Part 2 Bottom Side)


C
D
7503
7404
7401
52
53
1
208
104
105
157
156
26
25
50
1
25
24
48
1
51
2406
2515
2516
2517
2410
2526
3526
3516
5501
5502
3547
3538
3535
3534
3537
3545
2508
3525
2509
2529
3624
3623
3521
3522
3512
2512
3568
3542
3541
3189
2102
3190
2107
2106
2105
2110
2109
7110
7106
7203
7204
2214
3227
3229
3258
6200
3105
3651
5607
5608
3654
7617
7618
7615
3648
2622
5606
7621
7620
2461
2460

CL 06532152_86b.eps
121200

Layout Mono Board: (Part 3 Bottom Side)


E
E
F
F
1
2
3
7800
7700
7450
7451
52
53
104
105
156
157
208
28
27
54
48
26
25
24
1
42
22
2
21
2461
2460
3900
3901
2828
3807
3827
2830
2829
2831
4802
4803
3591
3000
3001
3002
3004
3005
3006
3007
3008
3009
2000
2001
2002
2003
2004
2005
2006
2007
2008
3800
3815
3801
3802
3450
1021
3104 123 4285.

CL 06532152_86c.eps
121200

Start-up and Take-over Circuitry

With the mains voltage input, C7 will charge. When this voltage, (at pin 7 of IC1), reaches the start-up threshold of min 14.5 V, the control circuit starts to operate.
After start-up, IC1 requires a maximum sinking current of 17 mA, which the start-up circuitry cannot deliver. Therefore, a take-over circuitry (a coupled winding of transformer T1) is present. The voltage at this point will take over the supply voltage at pin 7 of the IC.
If the take-over circuit does not function, the IC will switch 'off' again at the minimal operating voltage of 8.5 V. The whole operation cycle will repeat itself with audible hiccup sound if take-over is not present.

Secondary Voltage Sensing

The secondary voltage regulating circuit comprises of opto-coupler IC2 (which isolates the error signal from the control IC on the primary side), and a reference component IC3 (TL431). The reference component has two functions:

- a very stable and accurate reference diode
- a high gain amplifier.

TL431

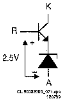


Figure 9-2

When the output voltage increases (due to a reduction in the load), the voltage across R23 increases to above the internal reference voltage of 2.5 V. IC3 will conduct and the current through the opto-coupler will increase. This results in an increase of the voltage at pin 2 of IC1, which will reduce the on time of FET Q1.
In the event of an output voltage decrease (due to an increase in the load), the control circuit will operate in the opposite way.

Primary Current Sensing

The current through FET Q1, will result in a voltage drop across R3A. This line goes to pin 3 of IC1, which is the current sense input. The higher the input voltage, the more the primary current is limited. In this way, the maximum output power of the power supply is limited.

Under-voltage Protection

Two under-voltage lockout comparators are incorporated, to guarantee that IC1 is fully functional
before the output stage is enabled. Separate comparators with built-in hysteresis monitor both the supply voltage at pin 7 and the reference voltage at pin 8.
If the supply voltage at pin 7 drops below 10 V (typical), e.g. due to a shorted secondary voltage or
excessive load, the drive pulse at pin 6 is disabled and the controller will switch 'off'.

Over-voltage Protection

The over-voltage circuitry (ZD1, Q7, and Q8) is used to detect an over-voltage situation on the secondary side of the transformer.
If, after start-up, the voltage at the zenerdiode ZD1 will exceeds its zener voltage, the internal latch circuit is triggered (via pin 1), the output buffer is disabled, and the SMPS goes into over-voltage protection. Now a complete restart sequence is required.
Note: If the event of the over-voltage situation remains present, the SMPS will go in sequence of protection, start-up, protection and the cycle repeats. This effect is highly audible.

9.3 Loader/Monoboard

SD1.1 Loader Assy

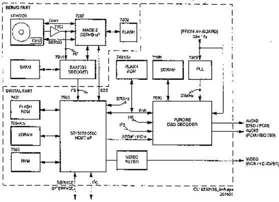


Figure 9-3

9.3.1 The Servo Part

The Optical Unit

The optical unit consists of two lasers, one for CD with a wavelength of 780 nm, and one for DVD with a wavelength of 650 nm. The TZA1033 (item 7102) controls the data from these lasers, and the supply to them.

The Signal Processor TZA1033

The TZA1033 (or DVDALAS2) is an analogue pre-processor and laser supply circuit. It contains data amplifiers and several options for radial tracking and focus control.
It is possible to optimise the dynamic range of this pre-amp/processor combination for the LF servo and RF data paths. The gain in both channels is separately programmable. This will guarantee an optimal playability for all kind of discs.
Also, a dual laser supply is implemented, with fully automatic laser control including stabilisation and an ON/OFF switch, plus a separate supply pin for power efficiency.
The servo signals go to the MACE2 servo processor, while the HF output signal, goes to the SAA7335 decoder (item 7311).

The Servo Processor MACE2

The servo circuit in the MACE2 IC (item 7207), takes care of the servo controls. In a CD system, there are some 12 control loops active. About six of them are needed to adjust the servo error signals, that is once per disc rotation. It also adjusts offsets, signal amplitudes, and loop gains (AGCs), to enlarge system robustness and to avoid expensive potentiometer adjustments in production.
The other six loops determine the laser spot position on the disc in the radial, axial (focus), and tangential directions.
It also has to take care that the spot accesses a required position as fast as possible. This access system consists of two parts, namely the actuator and the sled, which are (within a certain range) mechanically and electrically independent.
Therefore, during an access, the servo has to control as well the actuator as the sled.
The analogue signals from the diode pre-processor are converted into a digital representation using A/D converters.
For the communication between the host processor (STi5505) and the servo processor the S2B bus is used, this supports full-duplex asynchronous communication.
Note: For an extensive description of the MACE2 IC, see Service Manual 3122 785 11010.

The Decoder SAA7335

The SAA7335 (item 7311) is a high-end combined Compact Disc (CD) and Digital Versatile Disc (DVD) compatible decoding device. The device operates with an external 32 KB SRAM for DVD error correction and de-interleaving operations.

8. Alignments

No alignments available

9. Circuit Descriptions and List of Abbreviations

1. Introduction
2. Power Supply
3. Loader/Monoboard
4. Data Processing
5. Control and Display
6. Abbreviations

Notes:
- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the diagrams in chapter 6 and 7. Where necessary, you will find a separate drawing for clarification.

9.1 Introduction

9.1.1 Features

The SACD 900/DVD962SA range is a new model DVD/SACD player and is equipped with:
- Build in MPEG2, AC-3 and DSD decoder,
- 6 channel audio output,
- RGB video output on SCART (Europe only),
- YUV output,
- Progressive scan (for DVD962SA Non-Europe models),
- CD-RW compatible.

9.1.2 Differences

The SACD 900/DVD962SA is derived from the SACD 1000. It has a new Audio/Video board, Front Display board, Progressive scan board (same as used in Step2001 DVD-player) and another Power Supply module (same as used in Step2001 DVD-players).

9.1.3 Modules

The main modules are:
- Power Supply Unit (PSU).
- Mercury 1 Loader - VAL6011
- ASD1.1 Mono Board.
- Audio Video (A/V) Board.
- Front Display Board.
- Progressive Scan Board.

9.1.4 Service

This ASD1.x has the same ComPair connector as in previous DVD generations.
Flashing of the application-SW is not possible with the ComPair cable, except with a CD-R disc. For sets with Mask-ROM software, replace it with a programmed Flash (available via your Philips Service organisation).

9.2 Power Supply Unit

9.2.1 Introduction

This supply is a Switching Mode Power Supply (SMPS), which uses the control IC UC3842 to produce pulses to drive the power 'switch' (MOSFET). The regulation of the 'duty cycle', controls the supply output, at a fixed switching frequency (approximately 58 kHz, determined by the RC timing components at pin 4).

The UC3842 (item IC1) is a high performance, fixed frequency, current mode controller for DC-to-DC converter applications. This integrated circuit features a:
- trimmed oscillator for precise duty cycle control,
- temperature compensated reference,
- high gain error amplifier,
- current sensing comparator and
- high current totem pole output ideally suited for driving a power MOSFET (item Q1).

Also included are protective features consisting of input and reference under-voltage lockouts each with hysteresis, cycle by cycle current limiting, programmable output dead time and a latch for single pulse metering.

9.2.2 Output Voltages

- +12V_stdby (present during standby).
- +5V_ stdby (present during standby).
- +5V_digital (will switch off via Q3 during Standby).
- +5V_AV (will switch off via Q3 during Standby).
- 3V3 (present during standby).
- -5V (will switch off during standby).

9.2.3 Operation

Power Supply

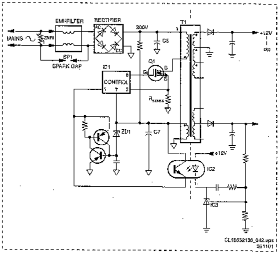


Figure 9-1

Mains Input Circuit
The bridge rectifier (D1-D4) rectifies the mains voltage, after which C5 smoothens this voltage. The DC voltage across this capacitor is the DC input voltage (approximately 300 V), to pin 1 of transformer T1.
The mains input also consists of a (differential mode) lightning protection ZNR1 and a (common mode) lightning protection SP1 (spark gap).

This IC decodes EFM or EFM+HF signals directly from the laser pre-amplifier, including analogue front-end, PLL data recovery, demodulation, and error correction.

The analogue front-end input converts the HF input to the digital domain via an 8-bit ADC, proceeded by an AGC circuit to obtain the optimum performance from the converter. An external resonator clocks this block. This subsystem recovers the data from the channel stream. It corrects asymmetry, performs noise filtering and equalisation, and finally recovers the bit clock and data from the channel using a digital PLL. The demodulator part detects the frame synchronisation signals and decodes the EFM (14 bit) and EFM+ (16 bit) data and sub-code words into 8-bit symbols. Via the serial output interface, the I^2S data (audio and video) go to the DVD decoder STi5505.

The spindle-motor interface provides both motor control signals from the demodulator and, in addition, contains a tachometer loop that accepts tachometer pulses from the motor unit. They drive the motor IC (item 7304).
The SAA7335 has two independent microcontroller interfaces. The first is a serial I^2C-bus and the second is a standard 8-bit multiplexed parallel interface. Both of these interfaces provide access to 32 8-bit registers for control and status.

9.3.2 The Digital Part

The Host Processor STi5505

The STi5505 host processor works on 3.3 V (VDD_STI). It comprises the following functions:

- video decoder which supports MPEG1 and MPEG2
- audio decoder which supports AC-3, MPEG1, MPEG2, PCM, 6-channel, virtual surround
- PAL/NTSC video encoder with simultaneously Y/C, CVBS and RGB/YUV outputs
- the video encoder supports Closed Captioning (CC) and MacroVision 7.0/6.1
- full screen On Screen Display (OSD) generator
- on-chip PLLs to generate all necessary clocks (as reference the 27 MHz video clock is used).

Input

Input data comes from the I^2S-bus. The front-end interface of this device, accepts DVD, CD and CD-DA information.

Signal Processing

For video, the input data stream is decoded to the appropriate MPEG, Sub Picture, and OSD data streams, after which they are fed to the PAL/NTSC encoder. This cell will convert the digital MPEG/Sub Picture/OSD stream into a standard base band signal and into RGB components. It handles interlaced and non-interlaced data, can perform CC/TXT encoding, and allows MacroVision copy protection.

For audio, the processing cell is a fully compatible Dolby AC-3, MPEG1, MPEG2, PCM decoder, capable of decoding 5.1 and 2 channel streams.

Output

For video, six analogue output pins are available on which CVBS, S-VHS (Y/C), and RGB/YUV signals are present. They go directly to the A/V board.

For audio, the STi5505 has three PCM digital outputs (for 6-channel analogue audio):

- PCM_OUT0: left and right (to pin 60 of FURORE IC7800).
- PCM_OUT1: centre and LFE (to pin 61 of FURORE IC7800).
- PCM_OUT2: left and right surround (to pin 62 of FURORE IC7800).

The FURORE SACD processor

General

The FURORE-IC is a one-chip design, containing all the hardware that is required for SACD processing. It is intended to interface with the STi-family (STi5505/STi5508) DVD video-decoders.
The FURORE-IC contains a memory interface to support an external 16 or 64 Mbit SDRAM.
During SACD application, the STi5505 serves as a host, whereby the FURORE is controlled via the EMI interface. The FURORE processing part is not used during all other play modes. In these modes, the PCM audio signals are fed through the FURORE to the appropriate DAC.

Block Diagram

FURORE

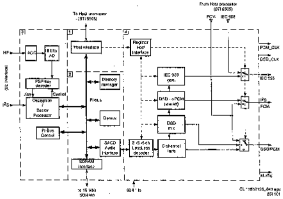


Figure 9-4

We can divide the FURORE-IC in four main parts (see block diagram):

1. **Host interface.** This is the link between the host bus and the internal registers and memory bus. It also supplies the general reset signal (HW and SW) and the interrupt signals.
2. **Data processing.** All modules and peripherals in this part are connected to a so-called PI-bus. It is beyond the scope of this manual to go more in detail on this subject.
3. **Copy protection.** On every SACD disc, a PSP-signal is recorded. The player can only play a disc if a valid PSP-signal is detected. This PSP-key is recorded, via a special mechanism, in the EFM-signal on the disc. To detect this key, the analogue HF-signal from the optical pick-up unit is fed directly to the FURORE-IC. Via an AGC, the signal is fed to an ADC. The digitised HF signal is then fed to a block where key is encrypted. Control of this process is done via the host interface (sector processor).
4. **DSD decoding and post processing.** In this part, all processing is done to generate a DSD and/or an I^2S stream (from the de-multiplexed stream coming from the data processing block), in such a way that it can directly be connected to a DA-converter. All processing is done on 384 * f_S.

Interfaces

- Basic Engine Interface:
  - **Data input interface.** The Basic Engine Interface (I^2S), is connected to the output of the SAA7335 (HD61) high speed CD decoder.
  - **Analogue HF Input.** The analogue HF input, coming from the optical pickup unit (OPU), is also fed to the FURORE-IC, to extract the copy-protection information PSP (Pit Signal Processing = invisible data is stored on to disc, which is required to decrypt the encrypted content).

- SDRAM Interface: The SDRAM interface forms a glue less interface to one 16 Mbit (or one 64 Mbit) SDRAM device. The interface takes care for the power-up sequence, mode programming and refreshing of the SDRAM devices. This is hard coded in the interface and does not have to be controlled by the host.

- Audio data input/output Interface:
  - **DSD/PCM combined data output.** DSD_PCM: Output intended for a combined 6-channel DSD (SACD) and PCM (DVD-CDDA) DAC. Switching between the PCM data coming from the STi5505, and the internal generated DSD signals, is done in the FURORE IC.
  - **Stereo DSD only output.** DSD_stereo: 2-channel DSD output with stereo down mix in the case of 5- and 6-channel, and normal stereo in case of 2-channel DSD mode.
  - **Stereo PCM data output.** Two possible stereo sources can be selected as stereo PCM output:
    1. Stereo PCM coming from the STi5505 via the PCM input on Furore.
    2. Stereo or down-mix-PCM derived via a decimation filter from the SACD-DSD signal.
  - **Digital audio output interface (IEC958).** The IEC958 format is intended to connect the SACD 900 to a digital receiver. No DSD signals are defined for IEC958, therefore the 'DSD-->PCM converted' signal is transmitted. Following two types of signals are possible on the digital interface:
    1. IEC958 data coming from the STi5505.
    2. IEC958 data (stereo or down-mix-PCM) derived via a decimation filter from the SACD-DSD signal.
  - **Clock + reset input.** Two different processing clocks and a reset pulse are needed:
    1. Sys_clk: System clock for data processing part, frequency can be 27 MHz or 768 * f_S.
    2. 384 * f_S: Processing clock for LLD and post processing.
    3. RESETn is an asynchronous reset and should be low for at least 1 period of DSD_CLK.

Memory

SDRAM

The size of the SDRAM is 2 times 16 Mbit or 1 time 64 Mbit (not simultaneously).

The SDRAM (items 7504 and 7505) has the following functions:

- it is used by the MPEG video decoder as a frame buffer,
- it holds the software and the variables used by it.

Flash-ROM

A 2MB Flash-ROM (item 7401) holds the DVD firmware, and is controlled by pin 16 (FLASH_OEN) of the STi5505. It must be able to perform a download (by disk or OS-link) in a Flash-only system.

EEPROM

User settings, player settings, and region code are stored in a 32 Kb I²C EEPROM.

9.4 Data Processing

9.4.1 Audio/Video (A/V) Board

General

This board is the interface panel between the DVD-player and its peripherals. See also block diagram in Chapter 6. This board has some added features compared to the 2nd generation DVD 2B.

The control of the A/V board is done by the I²C-decoder IC7107 (see table below):

Description	Pin	Hi	Lo
CLK_SEL	12	Internal clock	External clock
CLKFREQSEL	11	384 * fs	192 * fs
DAC_RESET	10	Normal	Reset
DSD_PCM	6	DSD stream output	PCM stream output
SACD_ACT	5	SACD	CD
SACD_BASSMGT	4	Configure 0 (LLL1)	Configure 1 (SSS1)
VMUTE	7	Video mute (audio direct)	No video mute
Reserved	9		

Block diagram

A/V Board

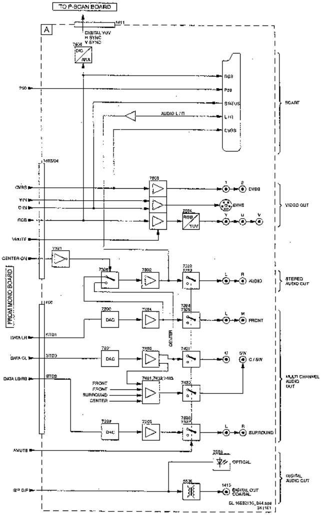

TO P-SCAN BOARD
A
1411
DIGITAL YUV
H SYNC
V SYNC
7600
DIG
ANA
RGB
P50
STATUS
AUDIO L / R
L/R
CVBS
SCART
P50
1403/04
CVBS
Y-IN
C-IN
RGB
VMUTE
7500
1
2
CVBS
SVHS
7504
RGB
YUV
Y
U
V
VIDEO OUT
CENTER ON
7321
7300
7302
7322
7323
L
R
AUDIO
STEREO AUDIO OUT
FROM MONO BOARD
1400
7200
DAC
7304
7324
7325
FRONT
CENTER
DATA LR
STD1
DATA CL
STD3
7201
DAC
7306
7421
C
SW
C / SW
DATA LS/RS
STD2
FRONT
FRONT
SURROUND
CENTER
7401,7402,7403
7420
MULTI CHANNEL AUDIO OUT
7202
DAC
7206
7326
7327
SURROUND
AMUTE
7504
OPTICAL
S/P D.F
5535
1415
DIGITAL OUT COAXIAL
DIGITAL AUDIO OUT
CL 16682195_044.eps
SK1161

Figure 9-5

Video

The analogue video signals from the SD1.1 Mono Board are fed to video buffer LA7109 (item 7500). Then (for Europe) they

go directly to the SCART plug or the appropriate VIDEO OUT cinch connectors.
The video output from the STi5505 is RGB, YC, and CVBS. To get YUV output, an RGB to YUV conversion matrix (item 7504) is necessary.

It is possible to set the SACD player in 'audio direct' mode. This means that there is no video output from the A/V board. This is indicated by a blue LED on the front panel, and is controlled via the VMUTE control signal from pin 7 of IC7107.

Audio
The digital audio signals are fed to three DACs for the 6-channel audio output:

- 7200 (CS4397) for the front left and right channel,
- 7201 (CS4392) for the centre and subwoofer,
- 7202 (CS4392) for the rear left and right channel.

All these DACs can accept both DSD and PCM data streams from the SD1.1.

Front channels
Due to the gain difference between DSD and PCM in the CS4397, an external circuit (7222, 7221 and 7203) is added to perform hardware attenuation for PCM data. It is controlled via the DSD_PCM control signal (pin 6 of IC7107):

- When this signals is 'low' (= PCM), the voltage at pin 28 is 3.3 V, resulting in 5 dB attenuation.
- When this signal is 'high' (= DSD), the voltage at pin 28 of IC7200 is 5 V, resulting in no attenuation.

After the DAC, the signals are amplified again with 5dB (IC7204) to compensate for the gain loss in the DAC.

Rear channels
All the rear channels have the same gain.

Centre channel
There is a control line from the STi5505, called CENTRE_ON, which is used to switch between the centre channel and front channels for both SACD- and DVD modes (see figure above).

Speaker setting for '6 channel DSD '
The SACD 900 will support two speaker-settings in this mode. This is controlled via the SACD_BASSMGT control signal (pin 4 of IC7107). This will switch a 120 Hz filter 'on' or 'off', for bass enhancement.
This setting is always 'off' when the set is playing PCM-stream.

9.4.2 Progressive Scan Board (if present)

General
The DVD962SA series offer progressive scan YUV outputs (only for non-Europe models).

Block Diagram

Progressive Scan Board

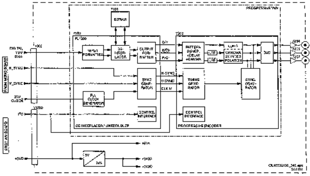


Figure 9-6

Progressive YUV
This creates a picture signal with double the scan lines of a conventional interlaced picture, to create a noticeably sharper and smoother image. It offers higher picture resolution and eliminates virtually all motion artefacts. Even on large screens, the progressive scan lines are barely noticeable and it reduces picture flickering significant.

This board also offers the Digital Crystal Clear feature, which allow you to fine-tune the following parameters:

- Gamma correction,
- Chroma and Luma delay.

9.5 Control and Display Panel

9.5.1 Control

Slave Processor
The most important component on this board is the (slave) microprocessor (item 7401). It works on an 8 MHz resonator (item 1119) and has a RESET circuit (7105), which is triggered by the +5Vstb. After the RESET pulse, the STB_CONT line will release the reset of the host microprocessor (see circuit around TS7452 on the Monoboard, diagram 4)
In addition, when going to Standby, the slave processor will reset the host processor. When the slave processor receives the correct IR (or key) code to leave the Standby mode, it resets the host processor.
Other slave processor functions are:

- generation of a scanning grid for the keys,
- generation of the display grid and segment scanning,
- generation of square signal to generate the filament voltage for FTD display,
- inputs for RC5/6 and P50 (P50 controller is build in).

Standby LED
Transistor 7104 drives the Standby LED. When the STBLED signal from the slave processor is 'high', the LED is 'off'.

Key Matrix
When a key on the local keyboard is pressed, the signal at the scanning pins of the microprocessor goes from +5 V to 0 V.

IR Receiver
The IR controller in the slave processor handles both RC5 and RC6 signals. The logic is +5 V for 'high' and 0 V for 'low'.

P50 Interface
P50 (or Easylink) is a bi-directional serial interface for communication between video equipment. For European sets, this communication goes via pin 10 of the SCART connector, while for other regions (when present), this is a cinch connector. The slave processor controls the P50 bus.

9.5.2 Display

FTD Display
The slave processor has an internal square signal generator (42 kHz), to generate the AC filament voltage. TS7106 and 7109 amplify the square signal before it is applied to the display.
The necessary power supply of -32 V is derived from the -40 V signal via voltage regulator 7400.

9.6 Data Sheets

DVDALAS2plus Advanced Analogue DVD Signal Processor and Laser Supply

TZA1033

FEATURES

- Operates with DVD-ROM,DVD-RAM, DVD+RW, DVD-RW, CD-ROM and CD-RW media
- Operates up to 64x CD-ROM and 8x DVD-ROM
- Support for Dual Light pen DVD systems (DVD/CDRW)
- DVD-RAM (C) playback capability
- DVD-RAM Land-Groove servo polarity switching
- 3 different tracking servo strategies:
  Conventional 3 beam tracking for CD
  Differential Phase Detection (DPD) for DVD-ROM (including option to emulate traditional drop out detection; drop out concealment)
  Advanced Push Pull with dynamic offset compensation for DVD-RAM (recorded and unrecorded areas)
- Radial error signal for fast track counting (FTC)
- 2 different strategies to read header data:
  - Full bandwidth Push Pull signal
  - Left and Right side signal
- Universal photo diode IC interface using internal conversion resistors and offset cancelation
- Flexible adaption to different light pen configurations
- Input buffer amplifiers with low-pass filtering
- RF data amplifier with wide (programmable) bandwidth equivalent to 64xCD / 8x DVD when using equaliser function
- Built-in equalisers cover CAV inner-outer disc range at highest speed.
- Programmable RF gain for DVD-ROM / DVD-RAM / CD-RW / CDROM applications(approx 50dB range)
- Balanced RF-Data signal transfer (single ended still supported)
- Fully automatic laser control including stabilization and an ON/OFF switch, plus a separate supplypin for power efficiency
- Automatic monitor diode polarity selection.
- 3 and 5 V compatible digital interface
- Enhanced signal conditioning in DPD circuit for optimal tracking performance under noisy conditions.

GENERAL DESCRIPTION

The DVDALAS2 is an analogue preprocessor and laser supply circuit for DVD / CD read only players. The device contains data amplifiers, several options for radial tracking and focus control. The preamplifier forms a versatile, programmable interface between dual, voltage output CD/DVD mechanisms to Philips' digital signal processor family for CD and DVD (Gecko, HDR65, Iguano, etc..)

The device contains serval options for radial tracking:
Conventional 3 beam tracking for CD;
Differential Phase Detector (DPD) for DVD;
Push Pull for DVD-RAM with flexible L/R weighing to compensate dynamic offsets e.g. beamlanding offset.
A radial error signal is generated to allow fast track count (FTC) during track jumps.

The dynamic range of this preamp/processor combination can be optimized for the LF servo and RF data paths. The gain in both channels can be programmed separately. This will guarantee an optimal playability for all kind of discs.

Several functions are included to allow playback of DVD-RAM(C) discs:

- The header information can be read via the data output path (RF)
- DC offset compensation techniques provide a fast settling after disc errors.
- Radial servo Polarity switch for land/groove
- two settings for focus offset correction for land and groove

The device can accommodate astigmatic, single foucault and double foucault detectors and can be used with P-type lasers with N- or P-sub monitor diodes. After an initial adjustment, the circuit will maintain control over the laser diode current. With an on-chip reference voltage generator, a constant and stabilized output power is ensured independent of ageing. A separate power supply connection allows the internal power dissipation to be reduced by connecting a low voltage supply.

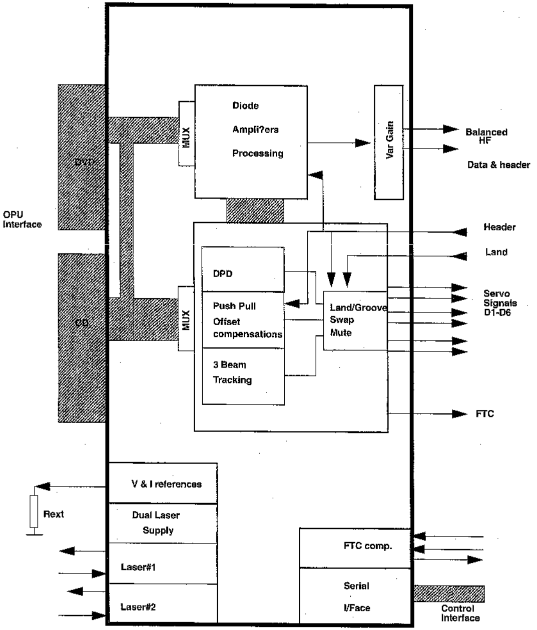
ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
TZA1023	LQFP64	Plastic low pro?le QFP64; body 10 x 10 x 1.4 mm	SOT314-2

DVDALAS2plus Advanced Analogue DVD Signal Processor and Laser Supply

TZA1033

DEVICE BLOCK DIAGRAM


Diode
Ampli?ers
Processing
MUX
Var Gain
Balanced HF
Data & header
DVD
OPU Interface
CD
Header
Land
DPD
Push Pull
Offset compensations
3 Beam
Tracking
MUX
Land/Groove
Swap
Mute
Servo Signals D1-D6
FTC
V & I references
Rext
Dual Laser Supply
Laser#1
Laser#2
FTC comp.
Serial
I/Face
Control Interface

DVDALAS2plus Advanced Analogue DVD Signal Processor and Laser Supply

TZA1033

PINNING

Name	Pin	Description
CD-A	1	CD pick up input A
CD-B	2	CD pick up input B
CD-C	3	CD pick up input C
CD-D	4	CD pick up input D
CD-REF	5	CD pick up reference voltage
CD-E	6	CD pick up input E
CD-F	7	CD pick up input F
DVD-A	12	DVD pick up input A
DVD-B	13	DVD pick up input B
DVD-C	14	DVD pick up input C
DVD-D	15	DVD pick up input D
DVD-ref	16	DVD pick up reference voltage
O-A	48	Servo current output for Focus-A
O-B	47	Servo current output for Focus-B
O-C	46	Servo current output for Focus-C
O-D	45	Servo current output for Focus-D
O-central	40	Testpin for offset cancelation
TD2	37	Internally connected
FTC-ref	36	Servo output voltage reference input
S1	42	Servo current output for radial tracking
S2	41	Servo current output for radial tracking
TD1	35	Internally connected
FTC	33	Fast track count voltage output
RFP	55	pos. RF output signal
RFN	56	neg. RF output signal
RF-REF	54	DC Reference signal input RF
LPF-DPD1	38	DPD Low pass bandwidth capacitor, channel pos
LPF-DPD2	39	DPD Low passbandwidth capacitor, channel neg
Land	20	Land/groove toggle input
HEADER	21	Header detector window input
CD-MI	62	CD laser monitor input
DVD-MI	10	DVD laser monitor input
CD-LO	61	CD laser output
DVD-LO	64	DVD laser output
COP	27	Positive inputFTC comparator
COM	28	Inverting inputFTC comparator
COO	29	FTC comparator output

DVDALAS2plus Advanced Analogue DVD Signal Processor and Laser Supply

TZA1033

Name	Pin	Description
SIDA	23	Serial host interface data input
SICL	24	Serial host interface clock input
SILD	25	Serial host interface load
VDDA1	8	Analog Supply voltage 1 (RF input)
VDDA2	59	Analog Supply voltage 2 (RF internal)
VDDA3	53	Analog Supply voltage 3 (RF output stage)
VDDA4	44	Analog Supply voltage 4 (Servo)
VDDD5	30	Digital Supply voltage (5V dig core)
VDDD3	22	Digital Supply voltage (3V I/O pads and FTC comp.)
VDDL	63	Supply voltage for laser
VSSA1	9	Analog Ground 1
VSSA2	58	Analog Ground 2
VSSA3	57	Analog Ground 3
VSSA4	43	Analog Ground 4
VSSD	26	Digital ground
Rext	60	Reference current input (Connect 12k1 to VSSA4)
STB	31	Standby input
TM	19	Testmode input
TDO	34	*test data out*

DVDALAS2plus Advanced Analogue DVD Signal Processor and Laser Supply

TZA1033

PINNING

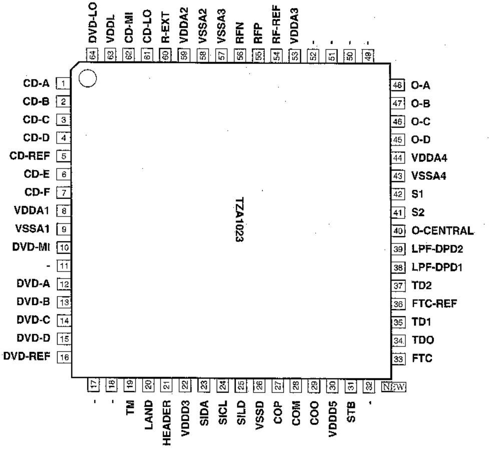

DVD-LO 64
VDDL 63
CD-MI 62
CD-LO 61
R-EXT 60
VDDA2 59
VSSA2 58
VSSA3 57
RFN 56
RFP 55
RF-REF 54
VDDA3 53
- 52
- 51
- 50
- 49
CD-A 1
CD-B 2
CD-C 3
CD-D 4
CD-REF 5
CD-E 6
CD-F 7
VDDA1 8
VSSA1 9
DVD-MI 10
- 11
DVD-A 12
DVD-B 13
DVD-C 14
DVD-D 15
DVD-REF 16
48 O-A
47 O-B
46 O-C
45 O-D
44 VDDA4
43 VSSA4
42 S1
41 S2
40 O-CENTRAL
39 LPF-DPD2
38 LPF-DPD1
37 TD2
36 FTC-REF
35 TD1
34 TDO
33 FTC
TZA1023
17 -
18 -
19 TM
20 LAND
21 HEADER
22 VDDD3
23 SIDA
24 SICL
25 SILD
26 VSSD
27 COP
28 COM
29 COO
30 VDDD5
31 STB
32 -
NEW

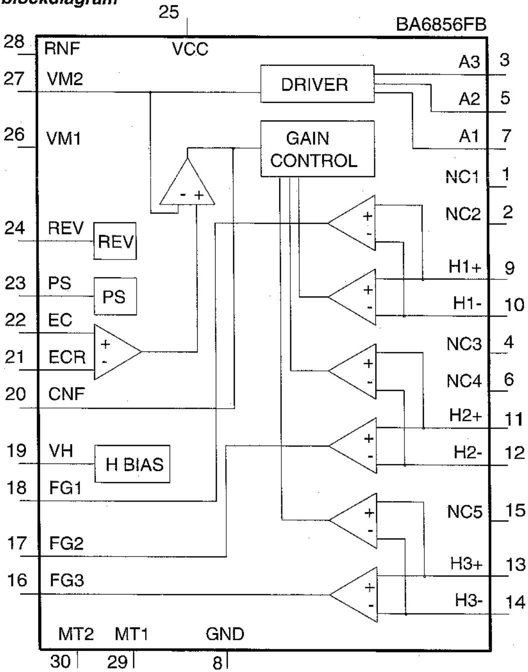
Fig.2 Pin configuration.

BA6856FP: 3 PHASE MOTOR DRIVER FOR DVD PLAYERS

Features

- /3-phase, full-wave pseudo linear driving system
- built-in power save
- built-in therma shut down circuit
- built-in current limit circuit
- built in Hall bias circuit
- built in FG-output (3-phase parallel output)
- with switching function of regular/ reverse rotations

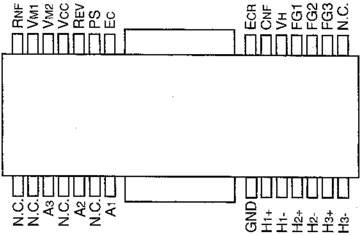
blockdiagram


25
BA6856FB
28 RNF
VCC
27 VM2
26 VM1
24 REV
REV
23 PS
PS
22 EC
21 ECR
20 CNF
19 VH
H BIAS
18 FG1
17 FG2
16 FG3
MT2 30
MT1 29
GND 8
DRIVER
GAIN CONTROL
A3 3
A2 5
A1 7
NC1 1
NC2 2
H1+ 9
H1- 10
NC3 4
NC4 6
H2+ 11
H2- 12
NC5 15
H3+ 13
H3- 14
+
-

pin description

PIN No	PIN NAME	DESCRIPTION
1	N.C.	Not connected
2	N.C.	Not connected
3	A_3	Output 3 for motor
4	N.C.	Not connected
5	A_2	Output 2 for motor
6	N.C.	Not connected
7	A_1	Output 1 for motor
8	GND	Ground
9	H_1^+	Hall input Amp1. positive input
10	H_1^-	Hall input Amp1. negative input
11	H_2^+	Hall input Amp2. positive input
12	H_2^-	Hall input Amp2. negative input
13	H_3^+	Hall input Amp3. positive input
14	H_3^-	Hall input Amp3. negative input
15	N.C.	Not connected
16	FG3	FG3 signal output terminal
17	FG2	FG2 signal output terminal
18	FG1	FG1 signal output terminal
19	V_H	Hall Bias
20	C_{NF}	Capacitor connection pin for phase compensation
21	E_{CR}	Torque control standard voltage input terminal
22	E_C	Torque control voltage input terminal
23	PS	POWER SAVE switch
24	R_{EV}	Reverse terminal
25	V_{CC}	Power supply for sinal division
26	V_{M2}	Power supply 2 for driver
27	V_{M1}	Power supply 2 for driver
28	R_{NF}	Power supply for driver division
FIN	FIN	GND

Terminal lay-out



DSP for CD and DVD-ROM systems

SAA7335

FEATURES

- Compatibility with CD-I, CD-ROM, MPEG-video DVD-ROM and DVD-video applications
- Designed for very high playback speeds
- Typical CD-ROM operation up to n = 12, DVD-ROM to n = 1.9, maximum rates (tbf)
- Matched filtering, quad-pass error correction (C1-C2-C1-C2), overspeed audio playback function included (up to 3 kbytes buffer)
- Lock-to-disc playback, Constant Angular Velocity (CAV), pseudo-Constant Linear Velocity (CLV) and CLV motor control loops
- Interface to 32 kbytes SRAM for DVD error correction and de-interleave
- Sub-code/ header processing for DVD and CD formats
- Programmable HF equalizer
- In DVD mode it is still compatible with Philips block decoders
- Sub-CPU interface can be parallel or fast I²C-bus
- On-chip clock multiplier.

GENERAL DESCRIPTION

This device is a high-end combined Compact Disc (CD) and Digital Versatile Disc (DVD) compatible decoding device. The device operates with an external 32 kbytes S-RAM memory for de-interleaving operations. The device provides quad-pass error correction for CD-ROM applications (C1-C2-C1-C2) and operates in lock-to-disk, CAV, pseudo CLV and CLV modes.

In DVD modes double-pass C1-C2 error correction is used which is capable of correcting up to 5 C1 frame errors and 16 C2 frame errors.

The SAA7335 contains all the functions required to decode an EFM or EFM+ HF signal directly from the laser pre-amplifier, including analog front-end, PLL data recovery, demodulation and error correction. The spindle motor interface provides both motor control signals from the demodulator and, in addition, contains a tachometer loop that accepts tachometer pulses from the motor unit.

The SAA7335 has two independent microcontroller interfaces. The first is a serial I²C-bus and the second is a standard 8-bit multiplexed parallel interface. Both of these interfaces provide access to a total of 32 × 8-bit registers for control and status.

This data sheet contains an descriptive overview of the device together with electrical and timing characteristics. For a detailed description of the device refer to the user guide *"SAU/UM96018"*.

Supply of this CD/DVD IC does not convey an implied license under any patent right to use this IC in any CD or DVD application.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_{DDD}	digital supply voltage	4.5	5.0	5.5	V
I_{DDD}	digital supply current	–	70	300	mA
V_{DDA}	analog supply voltage	4.5	5.0	5.5	V
I_{DDA}	analog supply current	–	70	300	mA
f_{xtal}	crystal input frequency	4	25	tbf	MHz
T_{amb}	operating ambient temperature	−20	–	+70	°C
T_{stg}	storage temperature	−55	–	+125	°C

DSP for CD and DVD-ROM systems SAA7335

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
SAA7335GP	LQFP100	plastic low pro?le quad ?at package; 100 leads; body 14 × 14 × 1.4 mm	SOT407-1

BLOCK DIAGRAM

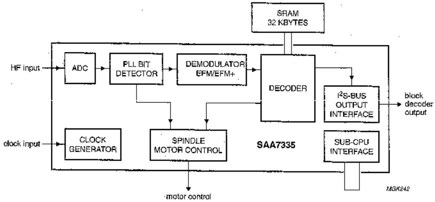

SRAM 32 KBYTES
HF input
ADC
PLL BIT DETECTOR
DEMODULATOR EFM/EFM+
DECODER
I²S-BUS OUTPUT INTERFACE
block decoder output
clock input
CLOCK GENERATOR
SPINDLE MOTOR CONTROL
SAA7335
SUB-CPU INTERFACE
motor control
MGK242

Fig.1 Simplified block diagram.

DSP for CD and DVD-ROM systems SAA7335

PINNING

SYMBOL	PIN	TYPE	DESCRIPTION
V_{SSA1}	1	supply	analog ground 1
I_{ref}	2	I	analog current reference input for ADC
REFLo	3	I	analog low reference input for ADC
REFHi	4	I	analog high reference input for ADC
VREF	5	I	analog negative input
HFIN	6	I	analog positive input
V_{SSA2}	7	supply	analog ground 2
AGCOUT	8	O	analog test pin output
V_{DDA2}	9	supply	analog supply voltage 2
V_{DDD1}	10	supply	digital supply voltage 1
V_{SSD1}	11	supply	digital ground 1
OTD	12	I	off track detect input
MOTO1	13	O	3-state motor control output
n.c.	14	–	not connected, reserved
MOTO2/T3	15	I/O	motor control output/tachometer 3 input
n.c.	16	–	not connected, reserved
T1	17	I	tachometer 1 input
T2	18	I	tachometer 2 input
V_{DDD2}	19	supply	digital supply voltage 2
V_{SSD2}	20	supply	digital ground 2
TEST1	21	I	test input 1
TEST2	22	I	test input 2
POR	23	I	power-on reset input
MUXSWICH	24	I	use clock multiplier input
n.c.	25	–	not connected, reserved
CL1	26	O	divided clock output
BCAIN	27	I	BCA input
SDA	28	I/O	sub-CPU I^{2}C-bus serial data input/output
SCL	29	I	sub-CPU I^{2}C-bus serial clock input
INT	30	O	sub-CPU interrupt output (open-drain)
V_{DDD3}	31	supply	digital supply voltage 3
V_{SSD3}	32	supply	digital ground 3
da7	33	I/O	sub-CPU data bus bit 7 input/output (parallel)
da6	34	I/O	sub-CPU data bus bit 6 input/output (parallel)
da5	35	I/O	sub-CPU data bus bit 5 input/output (parallel)
n.c.	36	–	not connected, reserved
da4	37	I/O	sub-CPU data bus bit 4 input/output (parallel)
n.c.	38	–	not connected, reserved
da3	39	I/O	sub-CPU data bus bit 3 input/output (parallel)
da2	40	I/O	sub-CPU data bus bit 2 input/output (parallel)

SYMBOL	PIN	TYPE	DESCRIPTION
da1	41	I/O	sub-CPU data bus bit 1 input/output (parallel)
n.c.	42	–	not connected, reserved
da0	43	I/O	sub-CPU data bus bit 0 input/output (parallel)
V_{DDD4}	44	supply	digital supply voltage 4
V_{SSD4}	45	supply	digital ground 4
$\overline{\text{WRi}}$	46	I	sub-CPU write enable input (active LOW)
$\overline{\text{RDi}}$	47	I	sub-CPU read enable input (active LOW)
ALE	48	I	sub-CPU address latch enable input
CSi	49	I	sub-CPU chip select input (active HIGH)
STOPCLOCK	50	O	stop clock output
n.c.	51	–	not connected, reserved
V4	52	O	serial subcode output (for CD)
EBUOUT	53	O	digital audio output
SYNC	54	O	I^2S-bus sector sync output
FLAG	55	O	I^2S-bus correction ?ag output
DATA	56	O	I^2S-bus serial data output
BCLK	57	I/O	I^2S-bus bit serial clock input/output
WCLK	58	I/O	I^2S-bus word clock input/output
V_{DDD5}	59	supply	digital supply voltage 5
V_{SSD5}	60	supply	digital ground 5
RAMRW	61	O	RAM read/write control output
n.c.	62	–	not connected, reserved
RAMDA7	63	I/O	RAM data bus bit 7 input/output
RAMDA6	64	I/O	RAM data bus bit 6 input/output
RAMDA5	65	I/O	RAM data bus bit 5 input/output
RAMDA4	66	I/O	RAM data bus bit 4 input/output
RAMDA3	67	I/O	RAM data bus bit 3 input/output
RAMDA2	68	I/O	RAM data bus bit 2 input/output
n.c.	69	–	not connected, reserved
RAMDA1	70	I/O	RAM data bus bit 1 input/output
RAMDA0	71	I/O	RAM data bus bit 0 input/output
V_{DDD6}	72	supply	digital supply voltage 6
V_{SSD6}	73	supply	digital ground 6
RAMAD0	74	O	RAM address bit 0 output
RAMAD1	75	O	RAM address bit 1 output
RAMAD2	76	O	RAM address bit 2 output
RAMAD3	77	O	RAM address bit 3 output
RAMAD4	78	O	RAM address bit 4 output
RAMAD5	79	O	RAM address bit 5 output
RAMAD6	80	O	RAM address bit 6 output
V_{DDD7}	81	supply	digital supply voltage 7

DSP for CD and DVD-ROM systems

SAA7335

SYMBOL	PIN	TYPE	DESCRIPTION
V_{SSD7}	82	supply	digital ground 7
RAMAD7	83	O	RAM address bit 7 output
RAMAD8	84	O	RAM address bit 8 output
RAMAD9	85	O	RAM address bit 9 output
n.c.	86	–	not connected, reserved
RAMAD10	87	O	RAM address bit 10 output
RAMAD11	88	O	RAM address bit 11 output
RAMAD12	89	O	RAM address bit 12 output
RAMAD13	90	O	RAM address bit 13 output
RAMAD14	91	O	RAM address bit 14 output
V_{DDD8}	92	supply	digital supply voltage 8
V_{SSD8}	93	supply	digital ground 8
CRIN	94	I	analog crystal input
CROUT	95	O	analog crystal output
CFLG	96	O	correction statistics output
MEAS1	97	O	front-end telemetry output
V_{DDD9}	98	supply	digital supply voltage 9
V_{SSD9}	99	supply	digital ground 9
V_{DDA1}	100	supply	analog supply voltage 1

DSP for CD and DVD-ROM systems

SAA7335

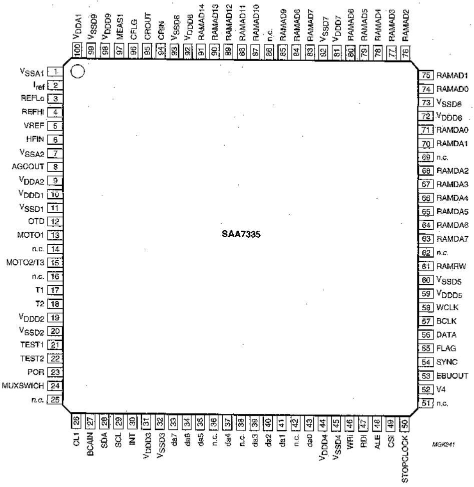

SAA7335
100 VDDA1
99 VSSD9
98 VDDD9
97 MEAS1
96 CFLG
95 CROUT
94 CRIN
93 VSSD8
92 VDDD8
91 RAMAD14
90 RAMAD13
89 RAMAD12
88 RAMAD11
87 RAMAD10
86 n.c.
85 RAMAD9
84 RAMAD8
83 RAMAD7
82 VSSD7
81 VDDD7
80 RAMAD6
79 RAMAD5
78 RAMAD4
77 RAMAD3
76 RAMAD2
1 VSSA1
2 Iref
3 REFLo
4 REFHi
5 VREF
6 HFIN
7 VSSA2
8 AGCOUT
9 VDDA2
10 VDDD1
11 VSSD1
12 OTD
13 MOTO1
14 n.c.
15 MOTO2/T3
16 n.c.
17 T1
18 T2
19 VDDD2
20 VSSD2
21 TEST1
22 TEST2
23 POR
24 MUXSWICH
25 n.c.
75 RAMAD1
74 RAMAD0
73 VSSD6
72 VDDD6
71 RAMDA0
70 RAMDA1
69 n.c.
68 RAMDA2
67 RAMDA3
66 RAMDA4
65 RAMDA5
64 RAMDA6
63 RAMDA7
62 n.c.
61 RAMRW
60 VSSD5
59 VDDD5
58 WCLK
57 BCLK
56 DATA
55 FLAG
54 SYNC
53 EBUOUT
52 V4
51 n.c.
26 CL1
27 BCAIN
28 SDA
29 SCL
30 INT
31 VDDD3
32 VSSD3
33 da7
34 da6
35 da5
36 n.c.
37 da4
38 n.c.
39 da3
40 da2
41 da1
42 n.c.
43 da0
44 VDDD4
45 VSSD4
46 WRi
47 RDi
48 ALE
49 CSi
50 STOPCLOCK
MGK241

Fig.2 Pin configuration.

FUNCTIONAL DESCRIPTION

Analog front-end

This block converts the HF input to the digital domain using an 8-bit ADC proceeded by an AGC circuit to obtain the optimum performance from the convertor. This block is clocked by ADCCLK which is set by the external crystal frequency plus a flexible clock multiplier and divider block.

PLL and bit detector

This subsystem recovers the data from the channel stream. The block corrects asymmetry, performs noise filtering and equalisation and finally recovers the bit clock and data from the channel using a digital PLL.

The equalizer and the data slicer are programmable.

Digital logic

All the digital system logic is clocked from the master ADC clock (ADCCLK) described above.

Advanced bit detector

The advanced bit detector offers improved data recovery for multi-layer discs and contains two extra detection circuits to increase the margins in the bit recovery block:

1. Adaptive slicer: adds a second stage slicer with higher bandwidth
2. Run length 2 push-back: all T2 run lengths are pushed back to T3, thereby automatically determining the erroneous edge and shifting the transitions on that edge.

Demodulator

FRAME SYNC PROTECTION CD MODE

This circuit detects the frame synchronization signals. Two synchronization counters are used in the SAA7335:

1. The coincidence counter: this is used to detect the coincidence of successive syncs. It generates a sync coincidence signal if 2 syncs are 588 ±1 EFM clocks apart.
2. The main counter: this is used to partition the EFM signal into 17-bit words. This counter is reset when:
   a) A sync coincidence is generated
   b) A sync is found within ±6 EFM clocks of its expected position.

The sync coincidence signal is also used to generate the lock signal which will go active HIGH when 1 sync coincidence is found. It will reset to LOW when, during 61 consecutive frames, no sync coincidence is found.

FRAME SYNC PROTECTION DVD MODE

This circuit detects the frame synchronization signals. Two synchronization counters are used in the SAA7335:

1. The coincidence counter: this is used to detect the coincidence of successive syncs. It generates a sync coincidence signal if 2 syncs are 1488 ±3 EFM+ clocks apart.
2. The main counter: this is used to partition the EFM+ signal into 16-bit words. This counter is reset when:
   a) A sync coincidence is generated
   b) A sync is found within ±10 EFM+ clocks of its expected position.

The sync coincidence signal is also used to generate the lock signal which will go active HIGH when 1 sync coincidence is found. It will reset to LOW when, during 61 consecutive frames, no sync coincidence is found.

EFM/EFM+ demodulation

The 14-bit EFM (16-bit EFM+) data and subcode words are decoded into 8-bit symbols.

Microcontroller interface

The SAA7335 has two microcontroller interfaces, one serial I^{2}C-bus and one parallel (8051 microcontroller compatible).

The two communication modes may be operated at the same time, the modes are described below:

1. Parallel mode: protocol compatible with 8052 multiplexed bus:
   a) da0 to da7 = address/data bus
   b) ALE = Address Latch Enable, latches the address information on the bus
   c) $\overline{\text{WRi}}$ = active LOW write signal for write to SAA7335
   d) $\overline{\text{RDi}}$ = active LOW read signal for read from SAA7335
   e) CSi = active HIGH Chip Select signal (this signal gates the $\overline{\text{RDi}}$ and $\overline{\text{WRi}}$ signals).
2. I^{2}C-bus mode: I^{2}C-bus protocol where SAA7335 behaves as slave device where:
   a) SDA = I^{2}C-bus data
   b) SCL = I^{2}C-bus clock
   c) I^{2}C-bus slave address (write mode) = 3EH
   d) I^{2}C-bus slave address (read mode) = 3FH
   e) Maximum data transfer rate = 400 kbits/s.

MICROCONTROLLER INTERFACE (I^{2}C-BUS MODE)

Bytes are transferred over the interface in single bytes of which there are two types; write data commands and read data commands.

The sequence for a write data command (1 data byte) is as follows:

- Send START condition
- Send address 3EH (write)
- Write command address byte
- Write data byte
- Send STOP condition.

The sequence for a read data command (that reads 1 data byte) is as follows:

- Send START condition
- Send address 3EH (write)
- Write status address byte
- Send STOP condition
- Send START condition
- Send address 3FH (read)
- Read data byte
- Send STOP condition.

READING AND WRITING DATA TO THE SAA7335

The SAA7335 has 32 × 8-bit configuration and status registers as shown in Table 1. Not all locations are currently defined and some remain reserved for future upgrades. These can be written to or read from via the microcontroller interface using either the serial or parallel control bus.

Am29LV160BT/Am29LV160BB

16 Megabit (2 M x 8-Bit/1 M x 16-Bit)
CMOS 3.0 Volt-only Sector Erase Flash Memory

DISTINCTIVE CHARACTERISTICS

- **Single power supply operation**
  - Full voltage range: 2.7 to 3.6 volt read and write operations for battery-powered applications
  - Regulated voltage range: 3.0 to 3.6 volt read and write operations and for compatibility with high performance 3.3 volt microprocessors
- **Manufactured on 0.35 µm process technology**
- **Supports Common Flash Memory Interface (CFI)**
- **High performance**
  - Full voltage range: access times as fast as 90 ns
  - Regulated voltage range: access times as fast as 80 ns
- **Ultra low power consumption (typical values at 5 MHz)**
  - 200 nA Automatic Sleep mode current
  - 200 nA standby mode current
  - 10 mA read current
  - 20 mA program/erase current
- **Flexible sector architecture**
  - One 16 Kbyte, two 8 Kbyte, one 32 Kbyte, and thirty-one 64 Kbyte sectors (byte mode)
  - One 8 Kword, two 4 Kword, one 16 Kword, and thirty-one 32 Kword sectors (word mode)
  - Supports full chip erase
  - Sector Protection features:

    A hardware method of locking a sector to prevent any program or erase operations within that sector

    Sectors can be locked in-system or via programming equipment

    Temporary Sector Unprotect feature allows code changes in previously locked sectors
- **Top or bottom boot block configurations available**
- **Embedded Algorithms**
  - Embedded Erase algorithm automatically preprograms and erases the entire chip or any combination of designated sectors
  - Embedded Program algorithm automatically writes and verifies data at specified addresses
- **Minimum 100,000 write cycle guarantee per sector**
- **Package option**
  - 48-ball FBGA
  - 48-ball µBGA
  - 48-pin TSOP
  - 44-pin SO
- **Compatibility with JEDEC standards**
  - Pinout and software compatible with single-power supply Flash
  - Superior inadvertent write protection
- **Data# Polling and toggle bits**
  - Provides a software method of detecting program or erase operation completion
- **Ready/Busy# pin (RY/BY#)**
  - Provides a hardware method of detecting program or erase cycle completion (not available on 44-pin SO)
- **Erase Suspend/Erase Resume**
  - Suspends an erase operation to read data from, or program data to, a sector that is not being erased, then resumes the erase operation
- **Hardware reset pin (RESET#)**
  - Hardware method to reset the device to reading array data

GENERAL DESCRIPTION

The Am29LV160B is a 16 Mbit, 3.0 Volt-only Flash memory organized as 2,097,152 bytes or 1,048,576 words. The device is offered in 48-ball FBGA, 48-ball µBGA, 44-pin SO, and 48-pin TSOP packages. The word-wide data (x16) appears on DQ15–DQ0; the byte-wide (x8) data appears on DQ7–DQ0. This device is designed to be programmed in-system with the standard system 3.0 volt V_{CC} supply. A 12.0 V V_{PP} or 5.0 V_{CC} are not required for write or erase operations. The device can also be programmed in standard EPROM programmers.

The device offers access times of 80, 90, and 120 ns, allowing high speed microprocessors to operate without wait states. To eliminate bus contention the device has separate chip enable (CE#), write enable (WE#) and output enable (OE#) controls.

The device requires only a **single 3.0 volt power supply** for both read and write functions. Internally generated and regulated voltages are provided for the program and erase operations.

The Am29LV160B is entirely command set compatible with the **JEDEC single-power-supply Flash standard**. Commands are written to the command register using standard microprocessor write timings. Register contents serve as input to an internal state-machine that controls the erase and programming circuitry. Write cycles also internally latch addresses and data needed for the programming and erase operations. Reading data out of the device is similar to reading from other Flash or EPROM devices.

Device programming occurs by executing the program command sequence. This initiates the **Embedded Program** algorithm—an internal algorithm that automatically times the program pulse widths and verifies proper cell margin. The **Unlock Bypass** mode facilitates faster programming times by requiring only two write cycles to program data instead of four.

Device erasure occurs by executing the erase command sequence. This initiates the **Embedded Erase** algorithm—an internal algorithm that automatically preprograms the array (if it is not already programmed) before executing the erase operation. During erase, the device automatically times the erase pulse widths and verifies proper cell margin.

The host system can detect whether a program or erase operation is complete by observing the RY/BY# pin, or by reading the DQ7 (Data# Polling) and DQ6 (toggle) **status bits**. After a program or erase cycle has been completed, the device is ready to read array data or accept another command.

The **sector erase architecture** allows memory sectors to be erased and reprogrammed without affecting the data contents of other sectors. The device is fully erased when shipped from the factory.

Hardware data protection measures include a low V_{CC} detector that automatically inhibits write operations during power transitions. The **hardware sector protection** feature disables both program and erase operations in any combination of the sectors of memory. This can be achieved in-system or via programming equipment.

The **Erase Suspend/Erase Resume** feature enables the user to put erase on hold for any period of time to read data from, or program data to, any sector that is not selected for erasure. True background erase can thus be achieved.

The **hardware RESET# pin** terminates any operation in progress and resets the internal state machine to reading array data. The RESET# pin may be tied to the system reset circuitry. A system reset would thus also reset the device, enabling the system microprocessor to read the boot-up firmware from the Flash memory.

The device offers two power-saving features. When addresses have been stable for a specified amount of time, the device enters the **automatic sleep mode**. The system can also place the device into the **standby mode**. Power consumption is greatly reduced in both these modes.

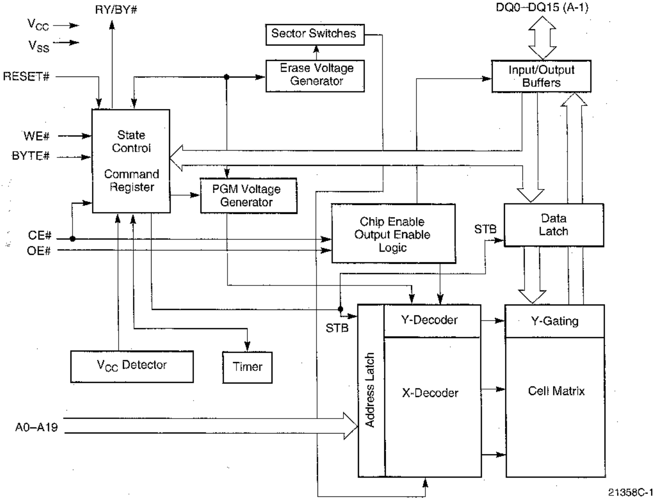
AMD's Flash technology combines years of Flash memory manufacturing experience to produce the highest levels of quality, reliability and cost effectiveness. The device electrically erases all bits within a sector simultaneously via Fowler-Nordheim tunneling. The data is programmed using hot electron injection.

PRODUCT SELECTOR GUIDE

Family Part Number	**Am29LV160B**		
Ordering Part Number: V_{CC} =3.0–3.6 V	**80R**		
V_{CC} = 2.7–3.6 V		**90**	**120**
Max access time, ns (t_{ACC})	80	90	120
Max CE# access time, ns (t_{CE})	80	90	120
Max OE# access time, ns (t_{OE})	30	35	50

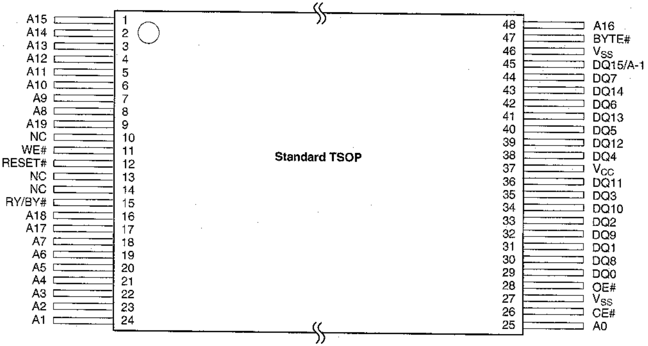
Note: *See "AC Characteristics" for full specifications.*

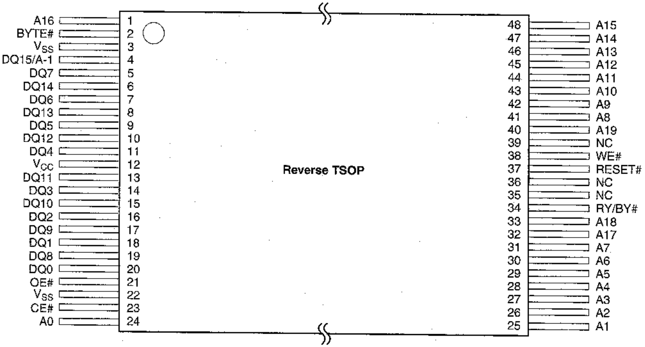
BLOCK DIAGRAM


RY/BY#
V_{CC}
V_{SS}
RESET#
WE#
BYTE#
CE#
OE#
A0–A19
State Control
Command Register
Sector Switches
Erase Voltage Generator
PGM Voltage Generator
Chip Enable Output Enable Logic
V_{CC} Detector
Timer
DQ0–DQ15 (A-1)
Input/Output Buffers
Data Latch
STB
STB
Address Latch
Y-Decoder
X-Decoder
Y-Gating
Cell Matrix

21358C-1

CONNECTION DIAGRAMS


Standard TSOP
A15 1
A14 2
A13 3
A12 4
A11 5
A10 6
A9 7
A8 8
A19 9
NC 10
WE# 11
RESET# 12
NC 13
NC 14
RY/BY# 15
A18 16
A17 17
A7 18
A6 19
A5 20
A4 21
A3 22
A2 23
A1 24
48 A16
47 BYTE#
46 V_{SS}
45 DQ15/A-1
44 DQ7
43 DQ14
42 DQ6
41 DQ13
40 DQ5
39 DQ12
38 DQ4
37 V_{CC}
36 DQ11
35 DQ3
34 DQ10
33 DQ2
32 DQ9
31 DQ1
30 DQ8
29 DQ0
28 OE#
27 V_{SS}
26 CE#
25 A0


Reverse TSOP
A16 1
BYTE# 2
V_{SS} 3
DQ15/A-1 4
DQ7 5
DQ14 6
DQ6 7
DQ13 8
DQ5 9
DQ12 10
DQ4 11
V_{CC} 12
DQ11 13
DQ3 14
DQ10 15
DQ2 16
DQ9 17
DQ1 18
DQ8 19
DQ0 20
OE# 21
V_{SS} 22
CE# 23
A0 24
48 A15
47 A14
46 A13
45 A12
44 A11
43 A10
42 A9
41 A8
40 A19
39 NC
38 WE#
37 RESET#
36 NC
35 NC
34 RY/BY#
33 A18
32 A17
31 A7
30 A6
29 A5
28 A4
27 A3
26 A2
25 A1

21358C-2

SYNCHRONOUS DRAM

MT48LC1M16A1 S - 512K x 16 x 2 banks

FEATURES

- PC100 functionality
- Fully synchronous; all signals registered on positive edge of system clock
- Internal pipelined operation; column address can be changed every clock cycle
- Internal banks for hiding row access/precharge
  1 Meg x 16 - 512K x 16 x 2 banks architecture with 11 row, 8 column addresses per bank
- Programmable burst lengths: 1, 2, 4, 8 or full page
- Auto Precharge Mode, includes CONCURRENT AUTO PRECHARGE
- Self Refresh and Adaptable Auto Refresh Modes
  - 32ms, 2,048-cycle refresh or
  - 64ms, 2,048-cycle refresh or
  - 64ms, 4,096-cycle refresh
- LVTTL-compatible inputs and outputs
- Single +3.3V ±0.3V power supply
- Supports CAS latency of 1, 2 and 3

OPTIONS	MARKING
• Configuration 1 Meg x 16 (512K x 16 x 2 banks)	1M16A1
• Plastic Package - OCPL* 50-pin TSOP (400 mil)	TG
• Timing (Cycle Time)	
6ns (166 MHz)	-6
7ns (143 MHz)	-7
8ns (125 MHz)	-8A
• Refresh 2K or 4K with Self Refresh Mode at 64ms	S

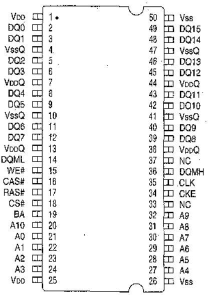
- Part Number Example: MT48LC1M16A1TG-7S

KEY TIMING PARAMETERS

SPEED	CLOCK	ACCESS TIME CL = 3**	SETUP	HOLD
-6	166 MHz	5.5ns	2ns	1ns
-7	143 MHz	5.5ns	2ns	1ns
-8A	125 MHz	6ns	2ns	1ns

*Off-center parting line
**CL = CAS (READ) latency

PIN ASSIGNMENT (Top View)
50-Pin TSOP


VDD 1
DQ0 2
DQ1 3
VssQ 4
DQ2 5
DQ3 6
VDDQ 7
DQ4 8
DQ5 9
VssQ 10
DQ6 11
DQ7 12
VDDQ 13
DQML 14
WE# 15
CAS# 16
RAS# 17
CS# 18
BA 19
A10 20
A0 21
A1 22
A2 23
A3 24
VDD 25
50 Vss
49 DQ15
48 DQ14
47 VssQ
46 DQ13
45 DQ12
44 VDDQ
43 DQ11
42 DQ10
41 VssQ
40 DQ9
39 DQ8
38 VDDQ
37 NC
36 DQMH
35 CLK
34 CKE
33 NC
32 A9
31 A8
30 A7
29 A6
28 A5
27 A4
26 Vss

Note: The # symbol indicates signal is active LOW.

	1 Meg x 16
Configuration	512K x 16 x 2 banks
Refresh Count	2K or 4K
Row Addressing	2K (A0-A10)
Bank Addressing	2 (BA)
Column Addressing	256 (A0-A7)

16Mb (x16) SDRAM PART NUMBER

PART NUMBER	ARCHITECTURE
MT48LC1M16A1TG S	1 Meg x 16

GENERAL DESCRIPTION

The 16Mb SDRAM is a high-speed CMOS, dynamic random-access memory containing 16,777,216 bits. It is internally configured as a dual 512K x 16 DRAM with a synchronous interface (all signals are registered on the positive edge of the clock signal, CLK). Each of the 512K x 16-bit banks is organized as 2,048 rows by 256 columns by 16 bits. Read and write accesses to the SDRAM are burst oriented; accesses start at a selected location and continue for a programmed number of locations in a programmed

GENERAL DESCRIPTION (continued)

sequence. Accesses begin with the registration of an ACTIVE command, which is then followed by a READ or WRITE command. The address bits registered coincident with the ACTIVE command are used to select the bank and row to be accessed (BA selects the bank, A0-A10 select the row). The address bits registered coincident with the READ or WRITE command are used to select the starting column location for the burst access.

The SDRAM provides for programmable READ or WRITE burst lengths of 1, 2, 4 or 8 locations, or the full page, with a burst terminate option. An AUTO PRECHARGE function may be enabled to provide a self-timed row precharge that is initiated at the end of the burst sequence.

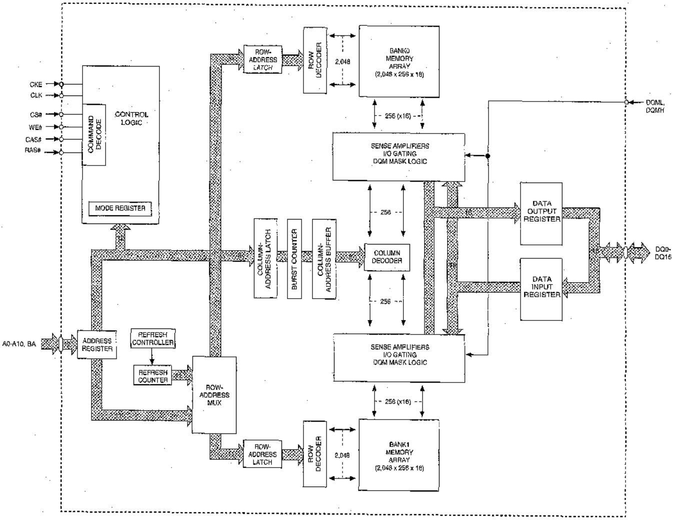
The 1 Meg x 16 SDRAM uses an internal pipelined architecture to achieve high-speed operation. This architecture is compatible with the 2 n rule of prefetch architectures, but it also allows the column address to be changed on every clock cycle to achieve a high-speed, fully random access. Precharging one bank while accessing the alternate bank will hide the PRECHARGE cycles and provide seamless, high-speed, random-access operation.

The 1 Meg x 16 SDRAM is designed to operate in 3.3V, low-power memory systems. An auto refresh mode is provided, along with a power-saving, power-down mode. All inputs and outputs are LVTTL-compatible.

SDRAMs offer substantial advances in DRAM operating performance, including the ability to synchronously burst data at a high data rate with automatic column-address generation, the ability to interleave between internal banks in order to hide precharge time, and the capability to randomly change column addresses on each clock cycle during a burst access.

16Mb: x16
SDRAM

FUNCTIONAL BLOCK DIAGRAM
1 Meg x 16 SDRAM


CKE
CLK
CS#
WE#
CAS#
RAS#
COMMAND DECODE
CONTROL LOGIC
MODE REGISTER
ROW-ADDRESS LATCH
ROW DECODER
2,048
BANK0 MEMORY ARRAY (2,048 x 256 x 16)
256 (x16)
SENSE AMPLIFIERS I/O GATING DQM MASK LOGIC
DQML, DQMH
256
COLUMN-ADDRESS LATCH
BURST COUNTER
COLUMN-ADDRESS BUFFER
COLUMN DECODER
256
DATA OUTPUT REGISTER
16
DQ0-DQ15
DATA INPUT REGISTER
A0-A10, BA
ADDRESS REGISTER
REFRESH CONTROLLER
REFRESH COUNTER
ROW-ADDRESS MUX
SENSE AMPLIFIERS I/O GATING DQM MASK LOGIC
256 (x16)
ROW-ADDRESS LATCH
ROW DECODER
2,048
BANK1 MEMORY ARRAY (2,048 x 256 x 16)

PIN DESCRIPTIONS

PIN NUMBERS	SYMBOL	TYPE	DESCRIPTION
35	CLK	Input	Clock: CLK is driven by the system clock. All SDRAM input signals are sampled on the positive edge of CLK. CLK also increments the internal burst counter and controls the output registers.
34	CKE	Input	Clock Enable: CKE activates (HIGH) and deactivates (LOW) the CLK signal. Deactivating the clock provides PRECHARGE POWER-DOWN and SELF REFRESH operations (all banks idle), ACTIVE POWER-DOWN (row ACTIVE in either bank) or CLOCK SUSPEND operation (burst/access in progress). CKE is synchronous except after the device enters power-down and self refresh modes, where CKE becomes asynchronous until after exiting the same mode. The input buffers, including CLK, are disabled during power-down and self refresh modes, providing low standby power. CKE may be tied HIGH.
18	CS#	Input	Chip Select: CS# enables (registered LOW) and disables (registered HIGH) the command decoder. All commands are masked when CS# is registered HIGH. CS# provides for external bank selection on systems with multiple banks. CS# is considered part of the command code.
15, 16, 17	WE#, CAS#, RAS#	Input	Command Inputs: RAS#, CAS# and WE# (along with CS#) define the command being entered.
14, 36	DQML, DQMH	Input	Input/Output Mask: DQM is an input mask signal for write accesses and an output enable signal for read accesses. Input data is masked when DQM is sampled HIGH during a WRITE cycle. The output buffers are placed in a High-Z state (two-clock latency) when DQM is sampled HIGH during a READ cycle. DQML corresponds to DQ0-DQ7; DQMH corresponds to DQ8-DQ15. DQML and DQMH are considered same state when referenced as DQM.
19	BA	Input	Bank Address Inputs: BA defines to which bank the ACTIVE, READ, WRITE or PRECHARGE command is being applied. BA is also used to program the twelfth bit of the Mode Register.
21-24, 27-32, 20	A0-A10	Input	Address Inputs: A0-A10 are sampled during the ACTIVE command (row-address A0-A10) and READ/WRITE command (column-address A0-A7, with A10 defining AUTO PRECHARGE) to select one location out of the 512K available in the respective bank. A10 is sampled during a PRECHARGE command to determine if all banks are to be precharged (A10 HIGH). The address inputs also provide the op-code during a LOAD MODE REGISTER command.
2, 3, 5, 6, 8, 9, 11, 12, 39, 40, 42, 43, 45, 46, 48, 49	DQ0-DQ15	Input/ Output	Data I/Os: Data bus.
33, 37	NC	–	No Connect: These pins should be left unconnected.
7, 13, 38, 44	$V_{DD}Q$	Supply	DQ Power: Provide isolated power to DQs for improved noise immunity.
4, 10, 41, 47	$V_{SS}Q$	Supply	DQ Ground: Provide isolated ground to DQs for improved noise immunity.
1, 25	V_{DD}	Supply	Power Supply: +3.3V ±0.3V.
26, 50	V_{SS}	Supply	Ground.

STi5505 (Rev. Ax)

DVD BACKEND DECODER WITH INTEGRATED HOST PROCESSOR

PRODUCT PREVIEW

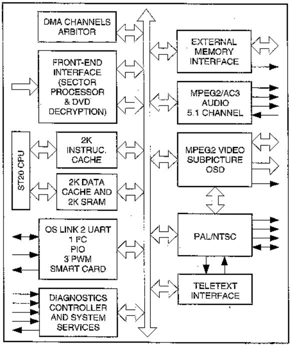
- INTEGRATED 32-BIT RISC HOST CPU
  - 2KBYTES INSTRUCTION CACHE, 2KBYTES DATA CACHE/SRAM
  - 50K DHRYSTONES/SEC (2.1) - 50MHz
- VIDEO DECODER
  - FULLY SUPPORTS MPEG-2 MP@ML
  - MEMORY REDUCTION - PAL IN 12MBITS
- SUBPICTURE DECODER
- HIGH PERFORMANCE ON-SCREEN DISPLAY
- AUDIO DECODER
  - 5.1 CHANNEL DOLBY AC-3® / MULTI CHANNEL MPEG-2 DECODING
  - DOWNMIX TO STEREO OR TO DOLBY PRO-LOGIC COMPATIBLE OUTPUTS FOR MPEG-2 AND AC-3
  - IEC6958 - IEC61937 COMPATIBLE OUTPUT
  - LPCM (DVD) MODE SUPPORTED
  - 6 CHANNELS OUTPUT
- PAL/NTSC ENCODER
  - MACROVISION^{TM} 7.01/6.1 COMPATIBLE
  - TELETEXT, AND CLOSED CAPTION
- HIGH PERFORMANCE SDRAM INTERFACE
- PROGRAMMABLE MEMORY INTERFACE FOR DRAM, ROM, PERIPHERALS ETC.
- FRONT-END CHANNEL IC INTERFACE
  - DVD, VCD AND CD-DA COMPATIBLE
  - DSS - DVB BISTREAMS
  - SERIAL AND PARALLEL INTERFACES
  - HARDWARE SECTOR FILTERING
  - INTEGRATED CSS DECRYPTION AND TRACK BUFFER
- INTEGRATED PERIPHERALS
  - 2 UARTS, 1 I^{2}C CONTROLLER, 3 PWM OUTPUTS, 3 TIMERS, 3 CAPTURE TIMERS, SMART CARD
  - 34 BITS OF PROGRAMMABLE I/O
  - OS LINK
- PROFESSIONAL TOOLSET SUPPORT
  - ANSI C COMPILER AND LIBRARIES
  - OPERATING SYSTEMS SUPPORT
  - ADVANCED DEBUGGING TOOLS
- 208 PIN PQFP PACKAGE

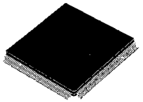
DESCRIPTION

The STi5505 provides a very highly integrated backend solution for DVD and combo DVD-DVB (Set Top Box) applications. The STi5505 incorporates a host CPU which handles both general application (DVD navigation, CD-DA, VCD, DVB) and drivers of the different embedded periphals (audio/video, subpicture decoders, OSD, PAL/NTSC encoder...).

The STi5505 offers one of the best cost-effective (memory savings, internal peripherals availability) solution to DVD-DVB applications with rapid time to market (Reference design, DVD-DVB Software Toolkit).

Figure 1 : General Block Diagram


DMA CHANNELS ARBITOR
FRONT-END INTERFACE (SECTOR PROCESSOR & DVD DECRYPTION)
ST20 CPU
2K INSTRUC. CACHE
2K DATA CACHE AND 2K SRAM
OS LINK 2 UART 1 I^{2}C PIO 3 PWM SMART CARD
DIAGNOSTICS CONTROLLER AND SYSTEM SERVICES
EXTERNAL MEMORY INTERFACE
MPEG2/AC3 AUDIO 5.1 CHANNEL
MPEG2 VIDEO SUBPICTURE OSD
PAL/NTSC
TELETEXT INTERFACE



PQFP208 (Plastic Quad Flat Pack)

ORDER CODE : STi5505ACV

I - GENERAL DESCRIPTION

The performance offered by the ST20 CPU and its associated hardware (decoders, encoder, peripherals...) allows an integrated and unified DVD or DVD-DVB software solution.

All the following operations are performed inside the STi5505 :

- application management (DVD Navigation, VCD, CD-DA, DVB-Program Guide ...),
- device data retrieval drivers (demultiplex, stream buffer management ...),
- device presentation drivers (video decoder, subpicture decoder, on-screen display, audio decoder, PAL/NTSC encoder ...),
- embedded peripherals drivers (UART, I^2C, Programmable I/O, Smart Card ...).

I.1 - ST20 32-bit CPU

The ST20 micro-core family has been developped by SGS-THOMSON Microelectronics to provide the tools and building blocks to enable the development of highly integrated application-specific 32-bits device at the lowest cost and fastest time to market.

The STi5505 integrates a ST20 C2 core with the following characteristics :

- 50K Dhrystones/s at 50MHz,
- 8/16 bits instructions (32 most common instructions in 8 bits),
- instruction cache 2Kbytes - write back replacement policy,
- internal SRAM 2Kbytes to ensure fast access to critical code, data, interrupt handler ...
- data cache 2 Kbytes - write back replacement policy,

The STi5505's ST20 is provided with advanced debugging tools :

- on-chip real-time emulation,
- debugging with minimal impact on software and performance,
- non intrusive attachment to the host via JTAG (IEEE1149.1),
- no intrusion into the performance of the CPU core,
- no intrusion into user code space by a debug kernel,
- only 40bytes used for breakpoint handler.

I.2 - Video Decoder

The video decoder implemented in the STi5505 uses a patented memory reduction/bandwith reduction scheme to offer the user the best bandwidth/memory size compromise.

The algorithm is lossless and uses "on-the-fly" decoding to reduce the memory requirements to two frame buffers in memory reduction mode.

In this mode, PAL decoding is contained in 12Mbits. When used in bandwith reduction mode, the memory usage is the normal three buffers but the bandwith required by the decoder is significantly reduced compared to a classical implementation.

In summary, the features of the decoder are :

- MPEG-2 Main Profile/Main Level (MP@ML) support,
- MPEG-2 program streams, Packet Elementary streams and MPEG-1 system streams support,
- memory reduction architecture allowing sharing of single 16 Mbits SDRAM between MPEG decoding, micro and transport functions - memory expandable to 32 Mbits of SDRAM,
- letter box (16:9) filter,
- pan-scan, horizontal and vertical image resizing,
- automatic error concealment.

I.3 - Subpicture Decoder

The STi5505 has a hardware DVD compliant subpicture decoder. Subpicture units are copied by DMA into subpicture bit buffer.

The subpicture decoder can decode complete subpicture units without any interaction from the ST20.

The main subpicture decoder features are :

- up to 720x480 or 720x576 subpicture area,
- internal LUTs for Sub Picture, Highlight and PCI (4 bits color and contrast outputs),
- internal color LUT (4 bits from SP, HL, PCI to 24 Y,Cr,Cb bits) for SP color inputs to MPEG, OSD, SP mixer.

I.4 - Audio Decoder

The audio decoder cell is a fully compatible Dolby AC-3™ / MPEG-1/MPEG-2 decoder capable of decoding both 5.1 and 2 channel streams compatible with the DVD standard.

Downmix from 5.1 channels is supported for both Dolby and MPEG-2 streams. The output can be sent directly to external DACs or formatted for transmission in accordance with the IE6958 standard.

The decoder can also handle linear PCM in accordance with the DVD standard. An integrated downsampler is provided for conversion from 96 kHz to 48kHz.

STi5505 (Rev. Ax)

I - GENERAL DESCRIPTION (continued)

The main features of the decoder core are :

- Decodes 5.1 Dolby AC-3 Digital surround,
- Output to 6 channels. Downmix modes : 1, 2, 3 or 4 channels for MPEG and AC-3 streams,
- Karaoke mode for DVD. MPEG-2 capable, AC-3 capable,
- MPEG-1, 2-channel audio decoder layers 1 and 2,
- MPEG-2, 6-channel audio decoder layer 2,
- PCM : transparent. downsampling 96 to 48 kHz,
- Accepts MPEG-2 PES stream format for : MPEG-2, MPEG-1, Dolby AC-3 and Linear PCM,
- IEC6958 Output Interface,
- CD-DA PCM format (subcode output in IEC6958 user data),
- Downmix for Dolby Pro Logic compatible outputs for AC-3 and MPEG-2 (Pro Logic encoder),
- Pro Logic decoder,
- PLL for internal 44.1 and 48kHz PCM clock generation,
- On chip pink noise generator.

I.5 - High Performance On-Screen Display

The graphics performance of the STi5505 supports the new requirements for intelligent program guides and interactive applications.

The display interface supports up to 256 colors for each OSD region and a transparency feature allows mixing of video with the OSD. Fast access graphics and many other additional features are available and are supported by a graphics library.

Very high system performance is obtained by closely coupling the ST20 RISC processor and cache with the MPEG audio/video core and display memory.

Low latency RISC access and DMA engines allow rapid construction of bit maps.

I.6 - PAL/NTSC Encoder

The STi5505 integrates a PAL/NTSC encoder. It converts the digital MPEG/Sub Picture/OSD stream into a standard analog baseband PAL/NTSC signal and into RGB analog components. Six analog output pins are available on which it is possible to output CVBS, S-VHS (Y/C) and RGB formats.

The encoder handles interlaced and non-interlaced mode.

It can perform Closed Captions, CGMS or Teletext encoding and allows Macrovision 7.01/6.1 copy protection.

The encoder supports both master and slave modes for synchronization.

I.7 - Memory Interfaces

The STi5505 has been designed to minimize system costs by enabling various memory savings. Two kinds of memory interfaces are used on the STi5505 : a programmable External Memory Interface (EMI) and a high performance SDRAM interface.

The External Memory Interface supports several address ranges (memory banks). In each bank, a set of signals are entirely programmable and can be used to map 8/16 bits peripherals such as Front End channel ICs in DVD applications.

The EMI contains a zero glue logic DRAM and a low-cost EPROM interface.

This interface can be programmed to interface very easily peripherals.

The SDRAM memory interface supports gluelessly 125 MHz SDRAMs providing the adequate bandwiths to achieve MPEG decoding and display, OSD drawing and display, and general system use.

Memory savings can be realized on ROM requirements too : the ST20 VL-RISC micro-core has the highest code density of any 32 bit CPU, leading to the lowest cost program ROM.

I.8 - Front-End Interface

The STi5505 's front end interface accepts :

- DVD, VCD and CD-DA sectors,
- DVB-DSS transport stream.

In DVD mode, DVD, VCD and CD-DA information can be input into STi5505 through a serial interface or a generic parallel interface.

In serial mode, data are captured and filtered from I2S and V4 interfaces by an internal sector processor. V4 interface is used to capture VCD and CD-DA subcode information. In parallel mode, sector processor is bypassed.

I - GENERAL DESCRIPTION (continued)

The main features of the DVD interface are :

- DVD, VCD and CD-DA compatible,
- hardware sector filtering,
- subcode error correction for CD-DA,
- integrated CSS decryption,
- integrated track buffer support,
- DMA engine to ST20 memory.

In DVB-DSS mode, DVB-DSS transport stream is input through a serial interface. The STi5505 extracts and descrambles Packet Elementary Streams belonging to one user selected program to be decoded and presented.

The main features of the DVB-DSS interface are :

- descrambling (transport packet and packet elementary streams in DVB mode, transport packet in DSS mode ; up to 32 streams descrambling),
- PID and section filtering,
- clock recovery,
- DMA engine.

In DVB-DSS mode, a high speed digital interface allows to transfer packets between the Set Top Box and external units, either for recording or playback purposes. This interface provides also full support for an external IEEE1394 connection.

I.9 - Integrated Peripherals

Several peripherals generally used in DVD players or DVD-DVB combos have been integrated into the STi5505.

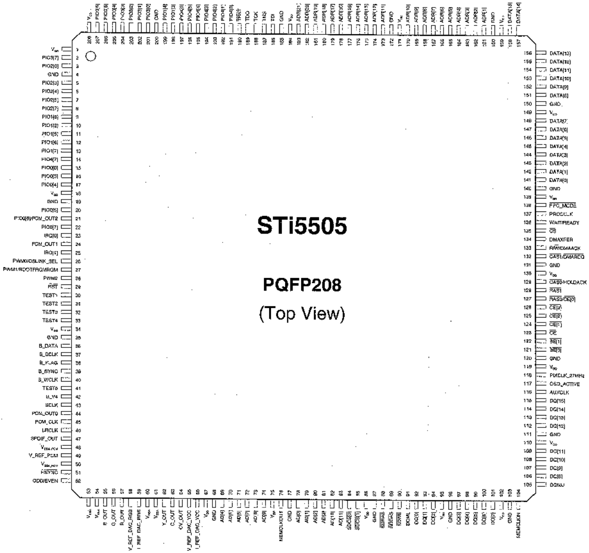
They are :

- two UARTs to interface remote control receivers, DVD front end, modem ...,
- one I^{2}C controller to interface serial memories, remote control receivers, microcontrollers...,
- 2 SmartCard interfaces (ISO7816-3) for DVB-DSS conditionnal access, pay per view ...,
- PWM/timer module for control of system clock,
- 34 programmable I/O pins,
- OS Link interface,
- JTAG with boundary scan for debug.

STi5505 (Rev. Ax)

II - PIN DESCRIPTION

II.1 - Pin Connections


208 VDD
207 PIO3[6]
206 PIO3[5]
205 PIO3[4]
204 PIO3[3]
203 PIO3[2]
202 PIO3[1]
201 PIO3[0]
200 GND
199 PIO1[4]
198 PIO1[3]
197 PIO4[6]
196 PIO4[5]
195 PIO4[4]
194 PIO4[3]
193 PIO4[2]
192 PIO4[1]
191 PIO4[0]
190 TRST
189 TDO
188 TCK
187 TMS
186 TDI
185 GND
184 VDD
183 ADR[21]
182 ADR[20]
181 ADR[19]
180 ADR[18]
179 ADR[17]
178 ADR[16]
177 ADR[15]
176 ADR[14]
175 ADR[13]
174 ADR[12]
173 ADR[11]
172 GND
171 VDD
170 ADR[10]
169 ADR[9]
168 ADR[8]
167 ADR[7]
166 ADR[6]
165 ADR[5]
164 ADR[4]
163 ADR[3]
162 ADR[2]
161 ADR[1]
160 GND
159 VDD
158 DATA[15]
157 DATA[14]
VDD 1
PIO3[7] 2
PIO2[0] 3
GND 4
PIO2[3] 5
PIO2[4] 6
PIO2[5] 7
PIO2[7] 8
PIO1[0] 9
PIO1[2] 10
PIO1[5] 11
PIO1[6] 12
PIO1[7] 13
PIO4[7] 14
PIO0[0] 15
PIO0[3] 16
PIO0[4] 17
VDD 18
GND 19
PIO0[5] 20
PIO0[6]/PCM_OUT2 21
PIO0[7] 22
IRQ[0] 23
PCM_OUT1 24
IRQ[1] 25
PWM0/OSLINK_SEL 26
PWM1/BOOTFROMROM 27
PWM2 28
RST 29
TEST1 30
TEST2 31
TEST3 32
TEST4 33
VDD 34
GND 35
B_DATA 36
B_DCLK 37
B_FLAG 38
B_SYNC 39
B_WCLK 40
TEST5 41
B_V4 42
SCLK 43
PCM_OUT0 44
PCM_CLK 45
LRCLK 46
SPDIF_OUT 47
VDDA PCM 48
V_REF_PCM 49
VSSA PCM 50
FSYNC 51
ODD/EVEN 52
STi5505
PQFP208
(Top View)
156 DATA[13]
155 DATA[12]
154 DATA[11]
153 DATA[10]
152 DATA[9]
151 DATA[8]
150 GND
149 VDD
148 DATA[7]
147 DATA[6]
146 DATA[5]
145 DATA[4]
144 DATA[3]
143 DATA[2]
142 DATA[1]
141 DATA[0]
140 GND
139 VDD
138 FPC_MODE
137 PROCCLK
136 WAIT/READY
135 CS
134 DMAXFER
133 R/W/DMAACK
132 CAS1/DMAREQ
131 GND
130 VDD
129 CAS0/HOLDACK
128 RAS1
127 RAS0/CE[0]
126 CE[3]
125 CE[2]
124 CE[1]
123 CE
122 BE[1]
121 BE[0]
120 GND
119 VDD
118 PIXCLK_27MHz
117 OSD_ACTIVE
116 AUXCLK
115 DQ[15]
114 DQ[14]
113 DQ[13]
112 DQ[12]
111 GND
110 VDD
109 DQ[11]
108 DQ[10]
107 DQ[9]
106 DQ[8]
105 DQMU
53 VDDA
54 VSSA
55 B_OUT
56 G_OUT
57 R_OUT
58 V_REF_DAC_RGB
59 I_REF_DAC_RGB
60 VDDA
61 VSSA
62 Y_OUT
63 C_OUT
64 CV_OUT
65 V_REF_DAC_YCC
66 I_REF_DAC_YCC
67 VDD
68 GND
69 AD[4]
70 AD[5]
71 AD[6]
72 AD[7]
73 AD[8]
74 AD[9]
75 VDD
76 MEMCLKOUT
77 GND
78 AD[0]
79 AD[1]
80 AD[2]
81 AD[3]
82 AD[10]
83 AD[11]
84 SDCS[0]
85 SDCS[1]
86 VDD
87 GND
88 SDRAS
89 SDCAS
90 SDWE
91 DQML
92 DQ[0]
93 DQ[1]
94 DQ[2]
95 VDD
96 GND
97 DQ[3]
98 DQ[4]
99 DQ[5]
100 DQ[6]
101 DQ[7]
102 VDD
103 GND
104 MEMCLKIN

II - PIN DESCRIPTION (continued)

II.2 - Pin List

Pin	Name	Type	Function
SUPPLIES			
1, 18, 34, 67, 75, 86, 95, 102, 110, 119, 130, 139, 149, 159, 171, 184, 208	V_{DD}		Power Supply
4, 19, 35, 68, 77, 87, 96, 103, 111, 120, 131, 140, 150, 160, 172, 185, 200	GND		Ground
53, 60	V_{DDA}		Analog Power Supply for DENC D/A Converters
54, 61	V_{SSA}		Analog Ground for DENC D/A Converters
48	V_{DDA_PCM}		Analog Power Supply for PLL PCM
49	V_REF_PCM		Analog Reference for PLL PCM
50	V_{SSA_PCM}		Analog Ground for PLL PCM
FRONT-END INTERFACE			
36	B_DATA	I	I^{2}S Data (DVD) or PARA_DATA[2] (DVD//) or Link Data (DVB/DSS)
40	B_WCLK	I/O	I^{2}S Word Clock or PARA_DATA[6] (DVD//) or NRSS_CLK (DVB/DSS)
37	B_BCLK	I	I^{2}S Bit Clock (DVD) or PARA_DATA[3] (DVD//) or Link Bit Clock (DVB/DSS)
38	B_FLAG	I	Error Flag (DVD) or PARA_DATA [4] (DVD//) or Link Sync (DVB/DSS)
39	B_SYNC	I	Sector / Abs Time Sync (DVD) or PARA_DATA[5] (DVD//) or Link Not Valid (DVB/DSS)
42	B_V4	I	Versatile Input Pin (Subcode Input) or PARA_DATA[7] (DVD//) or NRSS_IN (DVB/DSS)
VIDEO OUTPUT INTERFACE			
57	R_OUT	O	Red Output
56	G_OUT	O	Green Output
55	B_OUT	O	Blue Output
63	C_OUT	O	Chroma Output
64	CV_OUT	O	Composite Video Output
62	Y_OUT	O	Luma Output
59	I_REF_DAC_RGB	I	DAC Current Reference
66	I_REF_DAC_YCC	I	DAC Current Reference
58	V_REF_DAC_RGB	I	DAC Voltage Reference
65	V_REF_DAC_YCC	I	DAC Voltage Reference
117	OSD_ACTIVE	I/O	OSD Active
118	PIXCLK_27MHz	I	System Clock Input
51	HSYNC	I/O	Horizontal Sync
52	ODD/EVEN	I/O	Vertical Sync
AC-3/MPEG1-2 AUDIO OUTPUT INTERFACE			
43	SCLK	O	Serial Bit Clock
44	PCM_OUT0	O	Audio Serial Output Data 0
24	PCM_OUT1	O	Audio Serial Output Data 1
21	PCM_OUT2	O	Audio Serial Output Data 2
45	PCM_CLK	I/O	PCM Clock In or Out
46	LRCLK	O	Left/Right Clock
47	SPDIF_OUT	O	SPDIF Output

STi5505 (Rev. Ax)

II - PIN DESCRIPTION (continued)

II.2 - Pin List (continued)

Pin	Name	Type	Function
EXTERNAL INTERRUPTS			
23, 25	IRQ[0:1]	I	External Interrupts
PROGRAMMABLE I/O AND ALTERNATE FUNCTION (see Device Configuration Chapter)			
15	PIO0 [0]	I/O	General Purpose I/O or PARA_SYNC (DVD//Front End) or Sc1Data (Smart Card 1 Data I/O)
16	PIO0 [3]	I/O	General Purpose I/O or PARA_REQ (DVD//Front End) or Sc1Clk (Smart Card 1 Clock)
17	PIO0 [4]	I/O	General Purpose I/O or PARA_STR (DVD//Front End) or Sc1RST (Smart Card 1 Reset)
20	PIO0 [5]	I/O	General Purpose I/O or PARA_DATA[0] (DVD//Front End) or Sc1Cmd V_{CC} (Smart Card 1 Voltage Enable)
21	PIO0 [6]	I/O	General Purpose IO or Sc1DataDir (Smart Card 1 Dir)
22	PIO0 [7]	I/O	General Purpose I/O or PARA_DATA[1] (DVD//Front End) or Sc1Detect(Smart Card 1 Detect)
9	PIO1 [0]	I/O	General Purpose I/O or I^{2}C Data
10	PIO1 [2]	I/O	General Purpose I/O or I^{2}C Clock
198, 199	PIO1 [3:4]	I/O	General Purpose IO
11	PIO1 [5]	I/O	General Purpose IO or ASC1 TXD
12	PIO1 [6]	I/O	General Purpose IO or ASC1 RXD
13	PIO1 [7]	I/O	General Purpose IO or ASC3 TXD
3	PIO2 [0]	I/O	General Purpose I/O or Sc0Data (Smart Card 0 Data I/O)
5	PIO2 [3]	I/O	General Purpose I/O or Sc0Clk (Smart Card 0 Clock)
6	PIO2 [4]	I/O	General Purpose I/O or Sc0RST (Smart Card 0 Reset)
7	PIO2 [5]	I/O	General Purpose I/O or Sc0CmdV_{CC} (Smart Card 0 Voltage Enable)
8	PIO2 [7]	I/O	General Purpose I/O or Sc0Detect (Smart Card 0 Detect)
201	PIO3 [0]	I/O	General Purpose IO or OSLink In
202	PIO3 [1]	I/O	General Purpose IO or OSLink Out
203	PIO3 [2]	I/O	General Purpose IO or CPUReset
204	PIO3 [3]	I/O	General Purpose IO or CPU Analyse
205	PIO3 [4]	I/O	General Purpose IO or ErrorOut
206, 207, 2	PIO3 [5:7]	I/O	General Purpose IO
191-197	PIO4 [0:6]	I/O	General Purpose IO
14	PIO4 [7]	I/O	General Purpose IO or ASC3 RXD
JTAG INTERFACE			
188	TCK	I	Test Clock
186	TDI	I	Test Data Input
189	TDO	O	Test Data Input
187	TMS	I	Test Mode Select
190	$\overline{\text{TRST}}$	I	Test Reset
SYSTEM USE			
28	PWM2	O	PWM2 Output
27	PWM1/BOOTFROMROM	O/I	PWM1 Output or Configuration Oslink Pins
26	PWM0/OSLINK_SEL	O/I	PWM0 Output or Boot from ROM during Reset
29	$\overline{\text{RST}}$	I	Reset
116	AUXCLK	O	Auxilary Clock for Any Purpose

II - PIN DESCRIPTION (continued)

II.2 - Pin List (continued)

Pin	Name	Type	Function
SDRAM INTERFACE			
78-81, 69, 70-74, 82, 83	AD[0:11]	O	SDRAM Address Bus
92-94, 97-101, 106-109, 112-115	DQ[0:15]	I/O	SDRAM Data (Lower Byte)
84, 85	$\overline{\text{SDCS}}$[0:1]	O	SDRAM Chip Selects
89	$\overline{\text{SDCAS}}$	O	SDRAM CAS
88	$\overline{\text{SDRAS}}$	O	SDRAM RAS
90	$\overline{\text{SDWE}}$	O	SDRAM Write Enable
104	MEMCLKIN	I	SDRAM Memory Clock Input
76	MEMCLKOUT	O	SDRAM Memory Clock Output
91	DQML	O	DQ Mask Enable (Lower)
105	DQMU	O	DQ Mask Enable (Upper)
EXTERNAL MEMORY INTERFACE			
161-170, 173-183	ADR[1:21]	I/O	External Memory Address Bus
141-148, 151-158	DATA[0:15]	I/O	External Memory Data Bus
128	$\overline{\text{RAS1}}$/HOLDREQ	O	DRAM RAS or reserved
136	WAIT/READY	I/O	External Wait States or Reserved
133	R/$\overline{\text{W}}$/DMAACK	I/O	DRAM R/$\overline{\text{W}}$ Strobe or Reserved
121, 122	$\overline{\text{BE}}$[0:1]	O	Byte enable
129	$\overline{\text{CAS0}}$/HOLDACK	O/I	DRAM CAS or Reserved
132	$\overline{\text{CAS1}}$/DMAREQ	O	DRAM CAS or Reserved
124-126	$\overline{\text{CE}}$[1:3]	O	Chip Select for Banks 1 - 3
135	$\overline{\text{CS}}$	I	Reserved
137	PROCCLK	I/O	ST20 Clock or Reserved
127	$\overline{\text{RAS0}}$/$\overline{\text{CE0}}$	O	DRAM RAS or Chip Select for Bank 0
134	DMAXFER	I	Reserved
138	$\overline{\text{PPC\_MODE}}$	I	Reserved
123	$\overline{\text{OE}}$	I/O	Output Enable or Reserved
SDAV/P1394 INTERFACE			
30	TEST1	I/O	DATA_RX/STROBE_TX (SDAV Mode) or SDAV_CLK (P1394 Mode)
31	TEST2	I/O	STROBE_RX/DATA_TX (SDAV Mode) or DATA_IN/DATA_OUT (P1394 Mode)
32	TEST3	I/O	Direction (SDAV Mode) or DATA_VALID In/Out (P1394 Mode)
MISCELLANEOUS			
41	TEST5	O	NRSS_OUT (DVB/DSS)

STi5505 (Rev. Ax)

III - FUNCTIONAL DESCRIPTION

III.1 - Functional Modules

Figure 1 shows the subsystem modules that make up the STi5505. These modules are outlined below.

III.1 - CPU

The Central Processing Unit (CPU) on the STi5505 is the ST20-C2 32-bit processor core. It contains instruction processing logic, instruction and data pointers and an operand register. It directly accesses the high speed on-chip SRAM memory, which can store data or programs, and uses the Caches to reduce access time to off chip program and data memory.

The processor can access memory via the general purpose External Memory Interface (EMI) or via the SDRAM EMI which is shared with the MPEG decoder.

III.2 - Memory Subsystem

The STi5505 on-chip SRAM memory system provides 160 Mbytes/s internal data bandwidth, supporting pipelined 2 cycles internal memory access at 25ns cycle times. The STi5505 memory system consists of 2 Kbytes of SRAM, 2Kbytes of instruction cache, a 2Kbytes data cache that can be programmed to be SRAM, and an external memory interface (EMI).

The STi5505 product has 2 Kbytes of on-chip SRAM. The advantage of this is the ability b store time critical code on chip, for instance interrupt routines, software kernels or device drivers, and even frequently used data without these being flushed from the caches.

The instruction and data caches are direct mapped with a write-back system for the data cache and support burst accesses to the external memories for refill and write-back which are effective for increasing performance with page-mode and SDRAM memories.

The STi5505 EMI controls access to the external memory and peripherals while the SDRAM EMI provides access to the SDRAM buffer for the MPEG decoders, ST20 and DMA peripherals.

The STi5505 EMI can access a 16 Mbytes (or greater if DRAM is used) physical address space in each of the four general purpose memory banks, and provides sustained transfer rates of up to 80 Mbytes/s. Peripherals that support an asynchronous data acknowledge are supported as is an external Power PC which can share the bus with the STi5505 and access the SDRAM buffer through the device.

High memory bandwidths up to 200 Mbytes/s can be supported by the SDRAM EMI.

The STi5505 internal memory interconnect provides buffering and arbitration of memory access requests to sustain very high throughput of memory accesses.

III.3 - Syste m Services Module

The STi5505 system services module includes :

- Phase locked loop (PLL) - accepts 27MHz input and generates all the internal high frequency clocks needed for the CPU and the OS-Link.
- test access port - JTAG compatible.
- Diagnostics controller accessed via the JTAG port providing :
- Bootstrapping during development
- Hardware breakpoint and watchpoint
- Real time trace
- External LSA triggering support.

III.4 - Serial Communications

To facilitate the connection of this system the front end device and other peripherals, two UARTs (ASCs) are included in the device. The UARTs provide an asynchronous serial interface.

The UART can be programmed to support a range of baud rates and data formats, for example, data size, stop bits and parity. Two synchronous serial communications (SSC) interfaces are provided on the device. These can be used for a remote control device for example via an I²C or SPI bus.

III.5 - Interrupt Subsystem

The STi5505 interrupt subsystem supports eight prioritized interrupt levels. Two external interrupt pins are provided. Level assignment logic allows any of the internal or external interrupts to be assigned and, if necessary, share any interrupt level.

III.6 - Front End Interf ace & DVD Decryption

The front end interface accepts sectors in the case of DVD, MPEG-1 system stream in the case of VCD and PCM data for CD-DA applications on an I2S interface. In the case of VCD and CD-DA disks the subcode information is input via a simple asynchronous serial interface similar to a UART.

The bitstream and subcode stream then pass through a "sector processor" block which handles sector filtering in the case of DVD and sectorizing using the subcode stream for VCD and CD-DA systems.

III - FUNCTIONAL DESCRIPTION (continued)

The block also handles overspeed processing for all systems. The capturing of CD-DA sectors is based on a flywheel tiner to improve robusters by concealing erros in the subcode stream. For DVD the data, having had sector headers removed, then passes through a DVD conformant de-cryption stage and is written into any of the system memories using a programmable DMA engine. When a subcode stream is present it is locally buffered, by subcode block and can be read by the CPU for subsequent processing, if required.

III.7 - PWM and counter module

This unit includes three separate pulse width modulator (PWM) generators using a shared counter, and three timer compare and capture channels sharing a second counter.

The counters can be clocked from a pre-scaled internal clock or from a pre-scaled external clock via the capture clock input and the event on which the timer value is captured is also programmable.

The PWM counters are 8-bit with 8-bit registers to set the output high time. The capture/compare counter and the compare and capture registers are 32-bit.

III.8 - Parallel Programmable IO module

40 bits of parallel I/O are provided. 34 of then are connected to actual PIO pins. Each bit is programmable as an output or an input. The output can be configured as a totem pole or open drain driver. Input compare logic is provided which can generate an interrupt on any change on any input bit.

Many pins of the STi5505 device are multi-function and can either be configured as PIO or connected to an internal peripheral signal.

III.9 - MPEG Video decoder

The video decoder is a real-time video compression processor supporting the MPEG-1 and MPEG-2 standards at video rates up to 720 x 480 x 60 Hz and 720 x 576 x 50 Hz. Picture format conversion for display is performed by vertical and horizontal filters. User-defined bitmaps may be superimposed on the display picture through use of the on-screen display function.

III.10 - PAL/NTSC encoder

The digital encoder which is integrated in the STi5505 converts a multiplexed 4:2:2 YUV stream into a standard analog baseband PAL/NTSC signal and into RGB analog components. The encoder can also perform closed-caption, CGMS or teletext encoding and allows Macrovision^{TM} 7.01/6.1 copy protection.

III.11 - MPEG-2 Audio / Dolby AC-3 Decoder

The audio decoder is a Dolby AC-3 decoder capable of decoding both 5.1 and 2 channel DVD comformant bitstreams. The decoder also handles MPEG-1 (layers 1 & 2) and MPEG-2 layer 2 (6 channels). Downmix to 2 channels is possible for Dolby and MPEG standards with optional pro-logic encoding.

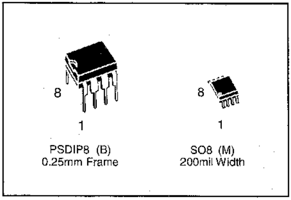
The decoder directly accepts MPEG-2 PES streams as input. The decoder is capable of supporting IEC6958-IEC61937 formatted outputs for AC-3 and MPEG audio, linear PCM (left & right,16, 18, 20 & 24 bits), zero output (Mute mode) and PCM audio.

ST24E32
ST25E32

32K SERIAL I²C EEPROM with EXTENDED ADDRESSING

NOT FOR NEW DESIGN

- COMPATIBLE with I²C EXTENDED ADDRESSING
- TWO WIRE SERIAL INTERFACE, SUPPORTS 400kHz PROTOCOL
- 1 MILLION ERASE/WRITE CYCLES, OVER the FULL SUPPLY VOLTAGE RANGE
- 40 YEARS DATA RETENTION
- SINGLE SUPPLY VOLTAGE
  - ± 4.5V to 5.5V for ST24E32 version
  - ± 2.5V to 5.5V for ST25E32 version
- WRITE CONTROL FEATURE
- BYTE and PAGE WRITE (up to 32 BYTES)
- BYTE, RANDOM and SEQUENTIAL READ MODES
- SELF TIMED PROGRAMING CYCLE
- AUTOMATIC ADDRESS INCREMENTING
- ENHANCED ESD/LATCH UP PERFORMANCES
- ***ST24E32 and ST25E32 are replaced by the M24C32***



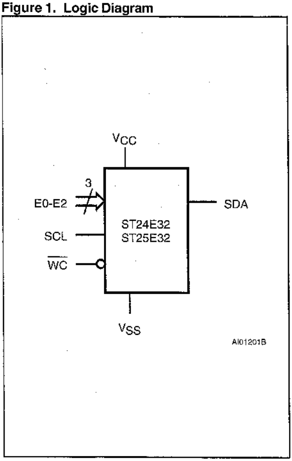
DESCRIPTION

The ST24/25E32 are 32K bit electrically erasable programmable memories (EEPROM), organized as 8 blocks of 512 x 8 bits. The ST25E32 operates with a power supply value as low as 2.5V. Both Plastic Dual-in-Line and Plastic Small Outline packages are available.

Table 1. Signal Names

E0 - E2	Chip Enable Inputs
SDA	Serial Data Address Input/Output
SCL	Serial Clock
$\overline{WC}$	Write Control
V_{CC}	Supply Voltage
V_{SS}	Ground

Figure 1. Logic Diagram



ST24E32, ST25E32

Figure 2A. DIP Pin Connections

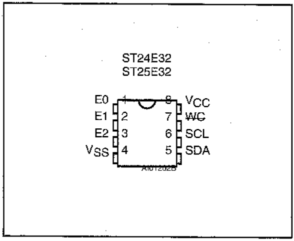


Figure 2B. SO Pin Connections

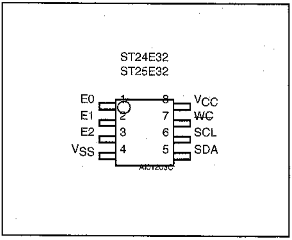


Table 2. Absolute Maximum Ratings (1)

Symbol	Parameter	Value	Unit
T_A	Ambient Operating Temperature	±40 to 125	°C
T_{STG}	Storage Temperature	±65 to 150	°C
T_{LEAD}	Lead Temperature, Soldering (SO8) 40 sec (PSDIP8) 10 sec	215 260	°C
V_{IO}	Input or Output Voltages	±0.6 to 6.5	V
V_{CC}	Supply Voltage	±0.3 to 6.5	V
V_{ESD}	Electrostatic Discharge Voltage (Human Body model) (2)	4000	V
	Electrostatic Discharge Voltage (Machine model) (3)	500	V

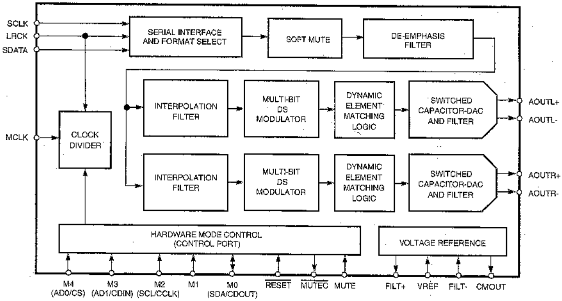
Notes: 1. Except for the rating °Operating Temperature Range°, stresses above those listed in the Table °Absolute Maximum Ratings° may cause permanent damage to the device. These are stress ratings only and operation of the device at these or any other conditions above those indicated in the Operating sections of this specification is not implied. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability. Refer also to the SGS-THOMSON SURE Program and other relevant quality documents.
2. 100pF through 1500Ω; MIL-STD-883C, 3015.7
3. 200pF through 0Ω; EIAJ IC-121 (condition C)

DESCRIPTION (cont'd)

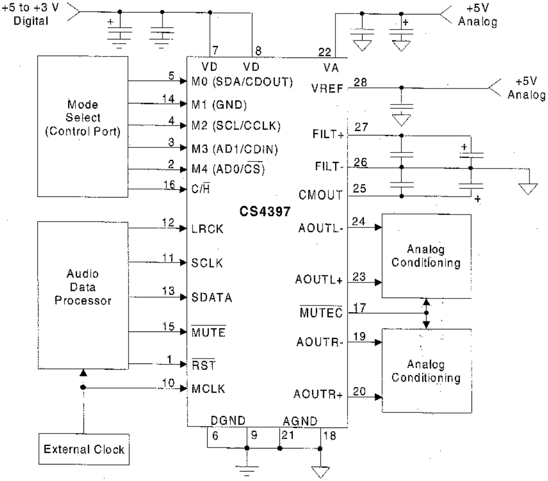
Each memory is compatible with the I^2C extended addressing standard, two wire serial interface which uses a bi-directional data bus and serial clock. The ST24/25E32 carry a built-in 4 bit, unique device identification code (1010) corresponding to the I^2C bus definition. The ST24/25E32 behave as slave devices in the I^2C protocol with all memory operations synchronized by the serial clock. Read and write operations are initiated by a START condition generated by the bus master. The START condition is followed by a stream of 4 bits (identification code 1010), 3 bit Chip Enable input to form a 7 bit Device Select, plus one read/write bit and terminated by an acknowledge bit.

CS4397

Block Diagram


SCLK
LRCK
SDATA
SERIAL INTERFACE AND FORMAT SELECT
SOFT MUTE
DE-EMPHASIS FILTER
INTERPOLATION FILTER
MULTI-BIT DS MODULATOR
DYNAMIC ELEMENT MATCHING LOGIC
SWITCHED CAPACITOR-DAC AND FILTER
AOUTL+
AOUTL-
MCLK
CLOCK DIVIDER
INTERPOLATION FILTER
MULTI-BIT DS MODULATOR
DYNAMIC ELEMENT MATCHING LOGIC
SWITCHED CAPACITOR-DAC AND FILTER
AOUTR+
AOUTR-
HARDWARE MODE CONTROL (CONTROL PORT)
VOLTAGE REFERENCE
M4 (AD0/CS)
M3 (AD1/CDIN)
M2 (SCL/CCLK)
M1
M0 (SDA/CDOUT)
RESET
MUTEC
MUTE
FILT+
VREF
FILT-
CMOUT

Pin Configuration


+5 to +3 V Digital
+5V Analog
+5V Analog
7
8
22
VD
VD
VA
Mode Select (Control Port)
5 M0 (SDA/CDOUT)
14 M1 (GND)
4 M2 (SCL/CCLK)
3 M3 (AD1/CDIN)
2 M4 (AD0/CS)
16 C/H
VREF 28
FILT+ 27
FILT- 26
CMOUT 25
CS4397
Audio Data Processor
12 LRCK
11 SCLK
13 SDATA
15 MUTE
1 RST
10 MCLK
AOUTL- 24
AOUTL+ 23
MUTEC 17
AOUTR- 19
AOUTR+ 20
Analog Conditioning
Analog Conditioning
DGND
AGND
6
9
21
18
External Clock

Typical Connection Diagram - Hardware Mode (Control Port Mode)

CL 06532152_099.eps
131200

Pin Function

No.	Pin Name	I/O	Description
1	RST	I	Reset input (Low active)
2	M4(AD0/CS)	I	Chip address bit0 for I2C
3	M3(AD1/CDIN)	I	Chip address bit1 for I2C
4	M2(SCL/CCLK))	I	Serial clock for I2C
5	M0(SDA/CDOUT)	I/O	Serial data for I2C
6	DGND		Digital ground
7	VD		Digital power supply +3.3V
8	VD		Digital power supply +3.3V
9	DGND		Digital ground
10	MCLK	I	Master clock PCM mode:256Fs DSD mode:192Fs (8.4672MHz)
11	SCLK	I	Serial data clock
12	LRCK(PCM) CLKMODE(DSD)	I I	PCM mode:Left/Right channel clock DSD mode:Select MCLK to DSD data rate clock rations
13	SDATA(PCM) DSD_L(DSD)	I	PCM mode:Serial audio data DSD mode:Direct Stream Digital audio data (Left)
14	M1(PCM) DSD_R(DSD)	I	PCM mode:(Low) DSD mode:Direct Stream Digital audio data (Right)
15	MUTE	I	Mute input (Low active)
16	C/H	I	Control port (H) /Hardware (L) mode select
17	MUTEC	O	Mute control (Low active)
18	AGND		Analog ground
19	AOUTR-	O	Right channel negative Analog out
20	AOUTR+	O	Right channel positive Analog out
21	AND		Analog ground
22	VA		Analog power supply +5.5V
23	AOUTL+	O	Left channel positive Analog out
24	AOUTL-	O	Left channel negative Analog out
25	CMOUT	O	Common mode voltage
26	FILT-	I	Reference ground
27	FILT+	O	Reference filter
28	VREF		Voltage reference input

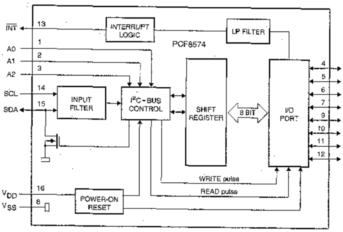
CL 06532152_100.eps
131200

9.6.1 Description of I²C Controller PC8574

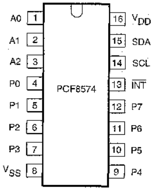
Block Diagram

PC8574

Block Diagram


INT
13
INTERRUPT LOGIC
LP FILTER
PCF8574
A0
1
A1
2
A2
3
SCL
14
SDA
15
INPUT FILTER
I²C-BUS CONTROL
SHIFT REGISTER
8 BIT
I/O PORT
4 P0
5 P1
6 P2
7 P3
9 P4
10 P5
11 P6
12 P7
WRITE pulse
READ pulse
VDD
16
VSS
8
POWER-ON RESET

Pin Configuration


A0 1
A1 2
A2 3
P0 4
P1 5
P2 6
P3 7
VSS 8
PCF8574
16 VDD
15 SDA
14 SCL
13 INT
12 P7
11 P6
10 P5
9 P4

Pin Function

SYMBOL	PIN		DESCRIPTION
	DIP16; SO16	SSOP20	
A0	1	6	address input 0
A1	2	7	address input 1
A2	3	9	address input 2
P0	4	10	quasi-bidirectional I/O 0
P1	5	11	quasi-bidirectional I/O 1
P2	6	12	quasi-bidirectional I/O 2
P3	7	14	quasi-bidirectional I/O 3
V_{SS}	8	15	supply ground
P4	9	16	quasi-bidirectional I/O 4
P5	10	17	quasi-bidirectional I/O 5
P6	11	19	quasi-bidirectional I/O 6
P7	12	20	quasi-bidirectional I/O 7
$\overline{INT}$	13	1	interrupt output (active LOW)
SCL	14	2	serial clock line
SDA	15	4	serial data line
V_{DD}	16	5	supply voltage
n.c.	-	3	not connected
n.c.	-	8	not connected
n.c.	-	13	not connected
n.c.	-	18	not connected

CL 06532152_101.eps
131200

9.7 Abbreviation list

ADC	Analogue to Digital Converter
AM	Amplitude Modulation
AP	Asia Pacific
AV	External Audio Video
BE	Basic Engine
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries
ComPair	Computer aided rePair
CC	Closed Caption
CD-DA	CD Digital Audio
CS	Chip Select
CVBS	Composite Video Blanking and Synchronisation
DAC	Digital to Analogue Converter
DAIO	Digital Audio Input Output
DENC	Digital Encoder
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DFU	Direction For Use: description for the end user
DNR	Dynamic Noise Reduction
DRAM	Dynamic RAM
DSD	Direct Stream Digital
DSP	Digital Signal Processing
DTS	Digital Theatre Sound
DVD	Digital Versatile Disc
EEPROM	Electrically Erasable and Programmable Read Only Memory
EFM	Eight to Fourteen bit Modulation
EMI	External Memory Interface (STi5505)
EU	Europe
EXT	External (source), entering the set via SCART or Cinch
FLASH	Flash memory
FM	Frequency Modulation
HP	Headphone
HPF	High Pass Filter
HW	Hardware
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I^2C	Integrated IC bus
I2S	Integrated IC Sound bus
IF	Intermediate Frequency
Interlaced	Scan mode where two fields are used to form one frame. Each field contains half the number of the total amount of lines. The fields are written in 'pairs', causing line flicker.
IR	Infra Red
IRQ	Interrupt Request
LATAM	Latin America
LED	Light Emitting Diode
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LLD	Loss Less Decoder
LPCM	Linear Pulse Code Modulation
LPF	Low Pass Filter
LRCLK	Left/Right clock
LS	Loudspeaker
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
MACE	Mini All Compact Disc Engine
MPEG	Motion Pictures Experts Group
NC	Not Connected
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
NTSC	National Television Standard Committee. Colour system mainly used in North America and Japan. Colour carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non Volatile Memory: IC containing TV related data e.g. alignments
OC	Open Circuit
OPU	Optical Pick up Unit
OSD	On Screen Display
P50	Project 50 or Easy Link
PAL	Phase Alternating Line. Colour system mainly used in West Europe (colour carrier = 4.433619 MHz) and South America (colour carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
PCB	Printed Circuit Board (see PWB)
PCM	Pulse Code Modulation
PCM_CLK	Audio system clock for DAC
PCM_OUTx	Audio serial output data
PDM	Physical Disc Mark
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency
Progressive Scan	Scan mode where all scan lines are displayed in one frame at the same time, creating a double vertical resolution.
PSP	Pit Signal Processing
PWB	Printed Wiring Board (see PCB)
RAM	Random Access Memory
RC	Remote Control handset
RC5	Remote Control system 5, signal from the remote control receiver
RGB	Red Green Blue
ROM	Read Only Memory
S2B	Serial to Basic Engine, communication bus between host- and servo processor
SACD	Super Audio Compact Disc
SCART	Syndicat des Constructeurs d'Appareils Radiorecepteurs et Televisieurs
SCL	Serial Clock I^2C
SCLK	Audio serial bit clock
SDA	Serial Data I^2C
SDRAM	Synchronous DRAM
SECAM	SEequence Couleur Avec Memoire. Colour system mainly used in France and East Europe. Colour carriers = 4.406250 MHz and 4.250000 MHz
S/PDIF	Sony Philips Digital InterFace
SRAM	Static RAM
STBY	Standby
SVHS	Super Video Home System
SW	Software
THD	Total Harmonic Distortion
TXT	Teletext
uP	Microprocessor
VCD	Video CD
VCR	Video Cassette Recorder
Y/C	Luminance (Y) and Chrominance (C) signal
YUV	Component video
0/6/12	SCART switch control signal on A/V board. 0 = loop through (AUX to TV), 6 = play 16:9 format, 12 = play 4:3 forma

10. Spare Parts List

Mechanical DVD962SA /001

Various

0002	3139 247 54861	FRONT ASSY DVD962SA/ 00X
0003	3139 247 51641	BUTTON POWER DVD956K PNT PRT
0025	3139 247 54891	TRAY ASSY DVD962SA/ 00X
0078	3139 243 10161	FILTER FTD SACD900
0150	3139 247 55111	BOTTOM FRAME ASSY SACD900
0250	3139 247 55011	PLATE BACK DVD962SA/ 00X PPT
0300	3139 247 51691	COVER TOP DVD956K PNT PRT
0350	3139 228 89521	PROD. ASSY RC19237003/ 01H PKD
0360▲	2422 070 98133	MAINSCORD EUR 1M5 BK B
0365	3103 308 92610	CABLE AUDIO 2X2RCA MALE 1.5MTR
0366	4822 321 61579	VIDEO-CABLE
0372	3111 170 21992	SCART CABLE (L=1.10M) BMS
0375	3139 246 11521	IFU DVD962SA/00X
1001	3139 248 81391	PCBAS AV SACD 2001 EU
1002	3139 248 81401	PCBAS FR SACD900 EU/ NON EU
1005▲	3139 248 70851	MODULE PSU BIL STEP2001 H
1101	3104 157 11200	CWAS FLEX DVD 16 130 32S
1102	3104 157 11190	CWAS FLEX DVD 22 130 32S
1104	3139 110 35851	FFC FOIL 24P/180/24P BD 1MMP

Mechanical DVD962SA /171

Various

0002	3139 247 54871	FRONT ASSY DVD962SA/ 17X
0003	3139 247 51641	BUTTON POWER DVD956K PNT PRT
0025	3139 247 54891	TRAY ASSY DVD962SA/ 00X
0078	3139 243 10161	FILTER FTD SACD900
0150	3139 247 55111	BOTTOM FRAME ASSY SACD900
0250	3139 247 55091	PLATE BACK DVD962SA/ 17X PPT
0300	3139 247 51691	COVER TOP DVD956K PNT PRT
0350	3139 228 89521	PROD. ASSY RC19237003/ 01H PKD
0360▲	2422 070 98152	MAINSCORD 1M79 USA BK B
0365	3103 308 92610	CABLE AUDIO 2X2RCA MALE 1.5MTR
0366	4822 321 61579	VIDEO-CABLE
0375	3139 246 11531	IFU DVD962SA/17X
1001	3139 248 81501	PCBAS DVD962 SA/NON EURO AV
1002	3139 248 81401	PCBAS FR SACD900 EU/ NON EU
1005▲	3139 248 70851	MODULE PSU BIL STEP2001 H
1007	3139 248 81121	PCBAS Q50/NON-EURO P.SCAN
1111	3104 157 11200	CWAS FLEX DVD 16 130 32S
1112	3104 157 11190	CWAS FLEX DVD 22 130 32S
1114	3139 110 35851	FFC FOIL 24P/180/24P BD 1MMP
1116	3139 241 00111	FFC FOIL 22P/90/22P BD1MMP FD

Mechanical DVD962SA /691

Various

0002	3139 247 54871	FRONT ASSY DVD962SA/ 17X
0003	3139 247 51641	BUTTON POWER DVD956K PNT PRT
0025	3139 247 54891	TRAY ASSY DVD962SA/ 00X
0078	3139 243 10161	FILTER FTD SACD900
0150	3139 247 55111	BOTTOM FRAME ASSY SACD900
0250	3139 247 55091	PLATE BACK DVD962SA/ 17X PPT
0300	3139 247 51691	COVER TOP DVD956K PNT PRT
0350	3139 228 89521	PROD. ASSY RC19237003/ 01H PKD
0360▲	2422 070 98151	MAINSCORD EUR 1M5 BK B
0361	3139 128 73010	MAINS PLUG ADAPTER
0365	3103 308 92610	CABLE AUDIO 2X2RCA MALE 1.5MTR
0366	4822 321 61579	VIDEO-CABLE
0375	3139 246 11541	IFU DVD962SA/69X
1001	3139 248 81501	PCBAS DVD962 SA/NON EURO AV
1002	3139 248 81401	PCBAS FR SACD900 EU/ NON EU
1005▲	3139 248 70851	MODULE PSU BIL STEP2001 H
1007	3139 248 81121	PCBAS Q50/NON-EURO P.SCAN
1111	3104 157 11200	CWAS FLEX DVD 16 130 32S
1112	3104 157 11190	CWAS FLEX DVD 22 130 32S
1114	3139 110 35851	FFC FOIL 24P/180/24P BD 1MMP
1116	3139 241 00111	FFC FOIL 22P/90/22P BD1MMP FD

Mechanical SACD900 /171

Various

0002	3139 247 54851	FRONT ASSY SACD900/ 17X
0003	3139 247 52111	BUTTON POWER DVD951 US PNT PRT
0025	3139 247 54881	TRAY ASSY SACD900/17X
0078	3139 243 10161	FILTER FTD SACD900
0150	3139 247 55111	BOTTOM FRAME ASSY SACD900
0250	3139 247 55001	PLATE BACK SACD900/17X PPT
0300	3139 247 51811	COVER TOP DVD951 PNT PRT
0350	3139 228 89521	PROD. ASSY RC19237003/ 01H PKD
0360▲	2422 070 98152	MAINSCORD 1M79 USA BK B
0365	3103 308 92610	CABLE AUDIO 2X2RCA MALE 1.5MTR
0366	4822 321 61579	VIDEO-CABLE
0375	3139 246 11511	IFU SACD900/17X
1001	3139 248 81371	PCBAS AV SACD 2001 US
1002	3139 248 81401	PCBAS FR SACD900 EU/ NON EU
1005▲	3139 248 70851	MODULE PSU BIL STEP2001 H
1101	3104 157 11200	CWAS FLEX DVD 16 130 32S
1102	3104 157 11190	CWAS FLEX DVD 22 130 32S
1104	3139 110 35851	FFC FOIL 24P/180/24P BD 1MMP

VAL 6011/04

Various

0001	9305 023 61104	VAL6011/04

Front PWB

Various

0002	3139 244 00440	FTD HOLDER DVD711
1100	4822 267 10565	4P
1101	4822 276 13775	SWITCH
1102	4822 276 13775	SWITCH
1103	4822 276 13775	SWITCH
1104	4822 276 13775	SWITCH
1105	4822 276 13775	SWITCH
1106	4822 276 13775	SWITCH
1107	2422 025 11244	CON BM V 07P M 2.50 EH B
1108	4822 267 10637	B5B-PH-K (5P)
1111	3139 240 50231	VFD 15-MT-70GNK
1112	4822 276 13775	SWITCH
1119	2422 540 98518	RES CER 8MHz CSTS*MHz 03 A
1200	2422 128 02939	SWI PUSH 2P 100MA 30V SPEC12 B
1205	4822 267 10567	4P

⊣⊢

2100	4822 122 33761	22pF 5% 50V
2101	4822 122 33761	22pF 5% 50V
2103	4822 124 40248	10µF 20% 63V
2104	4822 122 31765	100pF 2% 63V
2105	4822 122 31765	100pF 2% 63V
2106	4822 122 31765	100pF 2% 63V
2107	3198 028 52290	22µF 20% 50V
2108	3198 016 31020	0603 25V 1nF
2124	4822 126 14549	33nF 16V O6O3
2125	4822 124 80231	47µF 20% 16V
2126	3198 024 44730	47nF 50V
2127	3198 024 44730	47nF 50V
2128	3198 028 52290	22µF 20% 50V
2129	3198 024 44730	47nF 50V
2130	3198 024 44730	47nF 50V
2131	4822 126 14549	33nF 16V O6O3
2133	4822 122 33761	22pF 5% 50V
2134	4822 122 33761	22pF 5% 50V
2135	4822 126 14549	33nF 16V O6O3
2136	4822 124 81286	47µF 20% 16V
2137	4822 122 33761	22pF 5% 50V
2138	4822 124 11946	22µF 20% 16V
2139	4822 124 11947	10µF 20% 16V
2140	4822 126 14549	33nF 16V O6O3
2141	4822 126 14549	33nF 16V O6O3
2142	3198 016 31020	0603 25V 1nF
2143	4822 124 11946	22µF 20% 16V

-▭-

3101	4822 117 12864	82k 5% 0.6W
3102	4822 117 12864	82k 5% 0.6W
3104	4822 117 12864	82k 5% 0.6W
3105	4822 051 30221	220Ω 5% 0.062W
3109	4822 051 30472	4k7 5% 0.062W
3110	4822 051 30472	4k7 5% 0.062W
3111	4822 051 30472	4k7 5% 0.062W
3112	4822 051 30472	4k7 5% 0.062W
3113	4822 051 30472	4k7 5% 0.062W
3114	4822 051 30472	4k7 5% 0.062W
3115	4822 051 30103	10k 5% 0.062W
3116	4822 051 30472	4k7 5% 0.062W
3117	4822 051 30103	10k 5% 0.062W
3118	4822 051 30103	10k 5% 0.062W
3119	4822 051 30103	10k 5% 0.062W
3120	4822 051 30472	4k7 5% 0.062W
3121	4822 051 30331	330Ω 5% 0.062W
3123	4822 051 30109	10Ω 5% 0.062W
3125	4822 051 30109	10Ω 5% 0.062W
3126	4822 051 30109	10Ω 5% 0.062W
3127	4822 117 11152	4Ω7 5%
3128	4822 117 11152	4Ω7 5%
3129	4822 051 30331	330Ω 5% 0.062W
3130	4822 051 30331	330Ω 5% 0.062W
3131	4822 051 30472	4k7 5% 0.062W
3133	4822 051 30471	470Ω 5% 0.062W
3134	4822 051 30109	10Ω 5% 0.062W
3135	4822 051 30102	1k 5% 0.062W
3137	4822 051 30221	220Ω 5% 0.062W
3138	4822 051 30103	10k 5% 0.062W
3139	4822 051 30471	470Ω 5% 0.062W
3140	4822 051 30103	10k 5% 0.062W

3141	4822 117 13632	100k 1% 0.62W
3143	4822 051 30103	10k 5% 0.062W
3145	4822 051 30331	330Ω 5% 0.062W
3200	4822 051 30101	100Ω 5% 0.062W

▶|

6101	9965 000 04709	UDZ6.2BTE-17
6102	4822 130 11551	UDZS10B
6103	4822 130 83757	BAS216
6104	9322 153 37676	LB3333RT-E7898
6200	4822 130 82978	LTL-16KPE-P

⊗ ▭

7100	4822 130 60511	BC847B
7102	4822 130 60511	BC847B
7103	4822 130 60511	BC847B
7104	4822 130 60373	BC856B
7105	4822 130 60511	BC847B
7106	4822 130 40981	BC337-25
7108	4822 130 60511	BC847B
7109	4822 130 40854	BC327
7110	4822 130 60373	BC856B
7400	4822 209 31257	MC79L24ACP
7401	9965 000 10841	3104 123 94530 FTD DRIVER U-C
7402	9322 155 22667	

PSU

Various

C1	9965 000 09535	X1 CAP. 300V-0.1UF
C2	9965 000 09478	CERAMIC CAP. 1KV-471PF 10%
C3	9965 000 09478	CERAMIC CAP. 1KV-471PF 10%
C4	9965 000 09535	X1 CAP. 300V-0.1UF
C5	9965 000 09482	ELEC CAP.400V-100UF
C6	9965 000 09477	CERAMIC CAP. 1KV-221PF 10%
C7	9965 000 09481	ELEC CAP 47UF/25V
C8	9965 000 09488	MULTI-LAYER CAP. 50V-104PF 10
C9	9965 000 09478	CERAMIC CAP. 1KV-471PF 10%
D1	4822 130 30799	1N4007G
D2	4822 130 30799	1N4007G
D3	4822 130 30799	1N4007G
D4	4822 130 30799	1N4007G
D5	9965 000 09538	DIODE HER103 (CHENMKO) 1A/200V
D6	9965 000 09537	DIODE FR107 (CHENMKO) 1A/1000V
D7	4822 130 30621	1N4148
D8	9965 000 09538	DIODE HER103 (CHENMKO) 1A/200V
D9	9965 000 01538	DIODE SC 31DQ10 IR 100V 3,3A
F1	9965 000 09543	FUSE 3.15A/250V 5X20MM PIG-TAI
F2	9965 000 09542	FUSE 1.5A/250V 3.6X10MM PIG-TA
F3	9965 000 09544	SG PICO FUSE 1.0A/125V
L1	9965 000 09541	INDUCTOR DIP 5.5MM 4.5UH 20%
L2	9965 000 09473	TX89S-109C 5.5UH
L4	9965 000 09541	INDUCTOR DIP 5.5MM 4.5UH 20%
Q1	9965 000 09586	MOSFET N-CHANNEL 6A/ 600V TO-22
Q3	9965 000 09584	TRANSISTOR NPN 2SC945 TO-92 P
Q4	9965 000 09585	TRANSISTOR PNP 8550S TO-92 UNI
Q5	9965 000 09584	TRANSISTOR NPN 2SC945 TO-92 P
Q6	4822 130 61867	2SA733
Q7	4822 130 61867	2SA733
Q8	9965 000 09584	TRANSISTOR NPN 2SC945 TO-92 P
R2	9965 000 09576	METAL R 1/4W 2.7K 5%
R4	9965 000 09563	CARBON R 1/8W 470R 5%
R5	9965 000 09570	CARBON R 1/4W 1M 5%
R7	9965 000 09571	CARBON R 1/4W 220R 5%
R8	9965 000 09553	CARBON R 1/8W 10R 5%
R9	9965 000 09558	CARBON R 1/8W 10K 5%
T1	9965 000 09471	TX89S-109A FT ERL-28
C10	9965 000 09531	MYLAR CAP. 100V-103PF 5%
C11	9965 000 09531	MYLAR CAP. 100V-103PF 5%
C12	9965 000 09476	CERAMIC CAP. 1KV-103PF
C13	9965 000 09479	CERAMIC CAP. 50V-104PF 20%
C14	9965 000 09476	CERAMIC CAP. 1KV-103PF
C15	9965 000 09536	Y/C 400V-222PF
C16	9965 000 09479	CERAMIC CAP. 50V-104PF 20%
C22	9965 000 09489	MULTI-LAYER CAP. 50V-223PF 10
C23	9965 000 09486	ELEC CAP 330UF/25V
C24	9965 000 09480	ELEC CAP 100UF/25V
C25	9965 000 09484	ELEC CAP 10V/2200UF
C26	9965 000 09485	ELEC CAP 25V/1000UF
C28	9965 000 09480	ELEC CAP 100UF/25V
C29	9965 000 09486	ELEC CAP 330UF/25V
C30	9965 000 09480	ELEC CAP 100UF/25V
C31	9965 000 09483	ELEC CAP 47UF/63V
C32	9965 000 09483	ELEC CAP 47UF/63V
C33	9965 000 09480	ELEC CAP 100UF/25V
C34	9965 000 09480	ELEC CAP 100UF/25V
C35	9965 000 09487	MULTI-LAYER CAP. 50V-104PF 10
C36	9965 000 09487	MULTI-LAYER CAP. 50V-104PF 10
C37	9965 000 09487	MULTI-LAYER CAP. 50V-104PF 10
C38	9965 000 09487	MULTI-LAYER CAP. 50V-104PF 10
D10	4822 130 82627	SB540
D12	9965 000 09539	DIODE SR106 (CHENMKO) 1A/60V
D13	9965 000 09537	DIODE FR107 (CHENMKO) 1A/1000V
D14	4822 130 30799	1N4007G
D15	4822 130 30621	1N4148
D19	4822 130 30621	1N4148
IC1	9965 000 09545	IC PWM 0.3MA MAX SD3842A DIP-
IC2	9965 000 09548	PHOTOCOUPLER TCET1108G VISHAY
IC3	9965 000 09546	IC REGULATOR KIA431A 1% TO-92
IC4	9965 000 09547	IC LDO REGULATOR UT587 3A TO-2
L10	9965 000 09475	TX89S-109E TOROID INDUCTOR 150
L11	9965 000 09475	TX89S-109E TOROID INDUCTOR 150
L12	9965 000 09540	PEAKING CORE 1/4W 15UH I:530MA
NF2	9965 000 09472	TX89S-109B FT ET-20
R10	9965 000 09573	CARBON R 1/4W 5.6K 5%
R11	9965 000 09575	METAL R 1/4W 4.7R 5%
R12	9965 000 09558	CARBON R 1/8W 10K 5%
R14	9965 000 09578	METAL R 2W 47R 5%
R15	9965 000 09558	CARBON R 1/8W 10K 5%
R16	9965 000 09559	CARBON R 1/8W 1.5K 5%
R17	9965 000 09558	CARBON R 1/8W 10K 5%
R1A	9965 000 09567	CARBON R 1/8W 680K 5%
R1B	9965 000 09567	CARBON R 1/8W 680K 5%
R22	9965 000 09579	METAL R 1/8W 3.3K 1%
R23	9965 000 09579	METAL R 1/8W 3.3K 1%
R24	9965 000 09556	CARBON R 1/8W 100R 5%
R25	9965 000 09560	CARBON R 1/8W 220R 5%
R26	9965 000 09557	CARBON R 1/8W 1K 5%
R27	9965 000 09580	METAL R 1/4W 220R 1%
R28	9965 000 09581	METAL R 1/4W 360R 1%
R29	9965 000 09558	CARBON R 1/8W 10K 5%
R30	9965 000 09569	CARBON R 1/4W 10K 5%
R31	9965 000 09558	CARBON R 1/8W 10K 5%
R32	9965 000 09568	CARBON R 1/4W 4.7R 5%
R33	9965 000 09556	CARBON R 1/8W 100R 5%
R34	9965 000 09558	CARBON R 1/8W 10K 5%
R35	9965 000 09558	CARBON R 1/8W 10K 5%
R36	9965 000 09562	CARBON R 1/8W 3.3K 5%
R37	9965 000 09571	CARBON R 1/4W 220R 5%
R38	9965 000 09568	CARBON R 1/4W 4.7R 5%
R39	9965 000 09561	CARBON R 1/8W 2.2K 5%
R3A	9965 000 09577	METAL R 1W 0.68R 5%
R40	9965 000 09554	CARBON R 1/8W 150R 5%
R41	9965 000 09558	CARBON R 1/8W 10K 5%
R42	9965 000 09557	CARBON R 1/8W 1K 5%
R44	9965 000 09557	CARBON R 1/8W 1K 5%
R54	9965 000 09571	CARBON R 1/4W 220R 5%
R55	9965 000 09582	WIREWOUND R 3W 2.2R 5%
R56	9965 000 09555	CARBON R 1/8W 47K 5%
R57	9965 000 09572	CARBON R 1/4W 270K 5%
R58	9965 000 09572	CARBON R 1/4W 270K 5%
R59	9965 000 09574	CARBON R 1/2W 220R 10%
ZD1	4822 130 34281	BZX79-B15
ZD2	4822 130 31919	HZ6B2

⊣⊢

C0N1	9965 000 09583	SOCKET 9452 JUNGBECKER
CON2	9965 000 09534	WAFER 2570PS-12P MALE CONnF
CON3	9965 000 09533	WAFER 2570PS-7P MALE CONnF
CON4	9965 000 09532	WAFER 2570PS-4P MALE CONnF

▭

R18A	9965 000 09567	CARBON R 1/8W 680k 5%
R18B	9965 000 09567	CARBON R 1/8W 680k 5%
ZNR1	9965 000 09552	VARISTOR TVR10471 10R/ 470V THI

∿

L5,L6	9965 000 09474	TX89S-109D 30µH

AV PWB DVD962SA/001

Various

1102	2422 543 01283	RES XTL 16MHz 9344 NR-2C Y
1300	2422 132 06532	RELAY 2P 12V 2A DS2Y-S B
1400	2422 025 17409	CON BM V 24P F 1.00 FFC 0.3 B
1401	2422 026 05189	CON BM CINCH H 4P F YEWHRD B
1402	2422 026 05088	CON BM CINCH H 6P F B
1404	2422 025 16525	CON BM V 16P F 1.00 FFC 0.3 R
1405	4822 265 11154	52030-2210 (22P)
1407	2422 025 12352	CON BM EURO H 21P F BK GRND-L
1408	2422 026 05188	CON BM MDIN H 3P F TCS7927 B
1409	2422 026 05191	CON BM CINCH H 3P F RDBUGN B
1410	4822 267 31626	

⊣⊢

2100	4822 126 14305	100nF 10% 16V
2101	4822 122 33777	47pF 5% 63V
2102	4822 122 33761	22pF 5% 50V
2103	4822 122 33752	15pF 5% 50V
2104	4822 122 33761	22pF 5% 50V
2105	4822 122 33761	22pF 5% 50V
2106	4822 122 33752	15pF 5% 50V
2107	4822 122 33752	15pF 5% 50V
2108	4822 126 14305	100nF 10% 16V
2109	4822 126 14305	100nF 10% 16V
2110	4822 126 14305	100nF 10% 16V
2112	4822 126 14305	100nF 10% 16V
2113	4822 126 14305	100nF 10% 16V
2114	4822 124 11947	10µF 20% 16V
2116	4822 126 14305	100nF 10% 16V
2117	4822 126 14305	100nF 10% 16V
2200	4822 126 14305	100nF 10% 16V
2201	4822 126 14305	100nF 10% 16V
2202	4822 124 11947	10µF 20% 16V
2203	4822 126 14305	100nF 10% 16V
2204	4822 126 14305	100nF 10% 16V
2205	4822 126 14305	100nF 10% 16V
2206	4822 124 11947	10µF 20% 16V
2207	4822 126 14305	100nF 10% 16V
2208	4822 126 14305	100nF 10% 16V
2209	4822 126 14305	100nF 10% 16V
2210	4822 126 14305	100nF 10% 16V
2211	4822 126 14305	100nF 10% 16V
2212	4822 124 41643	100µF 20% 16V
2213	3198 028 41090	10µF 20% 35V
2214	4822 126 14305	100nF 10% 16V
2215	4822 126 14305	100nF 10% 16V
2216	4822 124 21913	1µF 20% 63V
2217	4822 124 21913	1µF 20% 63V
2218	4822 126 14305	100nF 10% 16V
2219	4822 124 11947	10µF 20% 16V
2220	4822 126 14305	100nF 10% 16V
2221	4822 126 14249	560pF 10% 50V
2222	4822 122 31765	100pF 2% 63V
2223	4822 126 14305	100nF 10% 16V
2224	4822 122 31765	100pF 2% 63V
2225	4822 126 14305	100nF 10% 16V

2226	4822 124 21913	1µF 20% 63V
2227	4822 124 21913	1µF 20% 63V
2228	4822 124 11947	10µF 20% 16V
2229	4822 126 14305	100nF 10% 16V
2230	2020 012 93792	100µF 16V
2231	4822 126 14249	560pF 10% 50V
2232	4822 122 31765	100pF 2% 63V
2233	4822 126 14249	560pF 10% 50V
2234	4822 122 31765	100pF 2% 63V
2235	2020 012 93792	100µF 16V
2236	4822 126 14249	560pF 10% 50V
2237	4822 126 14226	82pF 5% 50V
2238	4822 126 13881	470pF 5% 50V
2239	4822 126 14241	0603 50V 330P
2240	4822 126 14305	100nF 10% 16V
2241	4822 126 14305	100nF 10% 16V
2242	4822 126 14226	82pF 5% 50V
2243	4822 126 13881	470pF 5% 50V
2244	4822 124 22339	100UE 16V
2245	4822 126 14241	0603 50V 330P
2246	4822 126 13881	470pF 5% 50V
2247	4822 126 14241	0603 50V 330P
2248	4822 126 14226	82pF 5% 50V
2249	4822 126 14241	0603 50V 330P
2250	4822 126 14226	82pF 5% 50V
2251	4822 124 41643	100µF 20% 16V
2252	4822 126 13881	470pF 5% 50V
2253	4822 126 14305	100nF 10% 16V
2254	4822 126 14241	0603 50V 330P
2255	4822 126 13881	470pF 5% 50V
2256	4822 126 14226	82pF 5% 50V
2257	4822 126 14305	100nF 10% 16V
2258	4822 126 14226	82pF 5% 50V
2259	4822 124 41643	100µF 20% 16V
2260	4822 126 13881	470pF 5% 50V
2261	4822 126 14241	0603 50V 330P
2262	4822 126 14241	0603 50V 330P
2263	4822 126 13881	470pF 5% 50V
2264	4822 126 14226	82pF 5% 50V
2265	4822 124 41643	100µF 20% 16V
2266	4822 126 14226	82pF 5% 50V
2267	4822 126 13881	470pF 5% 50V
2268	4822 126 14241	0603 50V 330P
2269	4822 124 11947	10µF 20% 16V
2270	4822 126 14305	100nF 10% 16V
2271	4822 124 22651	1.0µF 20% 50V
2272	4822 124 22651	1.0µF 20% 50V
2273	4822 124 22651	1.0µF 20% 50V
2275	4822 126 14305	100nF 10% 16V
2276	4822 126 14305	100nF 10% 16V
2300	4822 126 14305	100nF 10% 16V
2301	4822 124 41643	100µF 20% 16V
2302	4822 126 14305	100nF 10% 16V
2303	4822 124 41643	100µF 20% 16V
2304	4822 126 14305	100nF 10% 16V
2305	4822 126 14305	100nF 10% 16V
2306	4822 126 14305	100nF 10% 16V
2307	5322 121 42661	330nF 5% 63V
2308	4822 124 11947	10µF 20% 16V
2309	5322 121 42661	330nF 5% 63V
2310	4822 122 31765	100pF 2% 63V
2311	4822 122 31765	100pF 2% 63V
2312	4822 126 14305	100nF 10% 16V
2313	4822 122 31765	100pF 2% 63V
2314	4822 122 31765	100pF 2% 63V
2315	4822 126 14305	100nF 10% 16V
2316	4822 126 14305	100nF 10% 16V
2317	5322 121 42661	330nF 5% 63V
2318	5322 121 42661	330nF 5% 63V
2319	4822 122 31765	100pF 2% 63V
2320	4822 122 31765	100pF 2% 63V
2321	4822 126 14305	100nF 10% 16V
2332	4822 126 14305	100nF 10% 16V
2333	4822 124 22339	100UE 16V
2334	4822 124 22339	100UE 16V
2335	4822 124 41643	100µF 20% 16V
2336	4822 124 41643	100µF 20% 16V
2337	4822 126 14305	100nF 10% 16V
2338	4822 126 14305	100nF 10% 16V
2339	4822 126 14305	100nF 10% 16V
2340	4822 126 14305	100nF 10% 16V
2400	4822 126 14305	100nF 10% 16V
2401	4822 126 14305	100nF 10% 16V
2402	4822 126 14305	100nF 10% 16V
2403	4822 126 14305	100nF 10% 16V
2404	4822 126 14305	100nF 10% 16V
2405	4822 126 14305	100nF 10% 16V
2406	4822 126 14305	100nF 10% 16V
2407	4822 126 14305	100nF 10% 16V
2408	5322 121 42661	330nF 5% 63V
2409	4822 126 14305	100nF 10% 16V
2410	4822 122 31765	100pF 2% 63V
2411	4822 122 31765	100pF 2% 63V
2412	4822 126 14305	100nF 10% 16V
2413	4822 121 42408	220nF 5% 63V
2414	4822 124 41643	100µF 20% 16V
2415	4822 124 22339	100UE 16V
2416	4822 126 14305	100nF 10% 16V
2417	4822 126 14305	100nF 10% 16V
2441	4822 126 14305	100nF 10% 16V
2500	4822 124 41643	100µF 20% 16V
2501	4822 126 14305	100nF 10% 16V
2502	4822 126 14305	100nF 10% 16V
2503	4822 124 41643	100µF 20% 16V
2504	4822 124 41643	100µF 20% 16V
2505	4822 126 14305	100nF 10% 16V
2506	3198 017 44740	0603 10V 470nF
2508	4822 124 40184	1000µF 20% 10V
2510	4822 126 13883	220pF 5% 50V
2511	4822 126 13883	220pF 5% 50V
2512	4822 126 13883	220pF 5% 50V
2516	4822 124 41643	100µF 20% 16V
2517	4822 124 11947	10µF 20% 16V
2518	4822 124 41643	100µF 20% 16V
2519	4822 124 41643	100µF 20% 16V
2520	4822 126 13883	220pF 5% 50V
2521	4822 126 13883	220pF 5% 50V
2522	4822 122 31765	100pF 2% 63V
2523	4822 126 13883	220pF 5% 50V
2524	4822 126 13883	220pF 5% 50V
2525	4822 124 41643	100µF 20% 16V
2526	4822 126 14305	100nF 10% 16V
2527	4822 126 13883	220pF 5% 50V
2528	4822 126 13883	220pF 5% 50V
2529	4822 126 13883	220pF 5% 50V
2530	4822 126 13883	220pF 5% 50V
2531	3198 016 36810	0603 25V 680P
2532	4822 126 13883	220pF 5% 50V
2533	4822 126 14494	22nF 10% 25V
2534	4822 126 14494	22nF 10% 25V
2535	4822 126 13883	220pF 5% 50V
2536	4822 124 11947	10µF 20% 16V
2537	4822 126 14305	100nF 10% 16V
2538	4822 122 33777	47pF 5% 63V
2540	4822 122 33777	47pF 5% 63V
2541	4822 126 13883	220pF 5% 50V
2542	4822 124 80231	47µF 20% 16V
2543	4822 124 80231	47µF 20% 16V
2544	4822 124 80231	47µF 20% 16V
2545	4822 124 80231	47µF 20% 16V
2646	5322 126 11583	10nF 10% 50V
2547	4822 126 14305	100nF 10% 16V
2548	4822 124 40184	1000µF 20% 10V
2549	4822 124 80791	470µF 16V 20%
2550	4822 124 80791	470µF 16V 20%

-▭-

3100	4822 051 30101	100Ω 5% 0.062W
3101	4822 051 30109	10Ω 5% 0.062W
3102	4822 051 30101	100Ω 5% 0.062W
3103	4822 051 30101	100Ω 5% 0.062W
3104	4822 051 30101	100Ω 5% 0.062W
3105	4822 051 30101	100Ω 5% 0.062W
3106	4822 051 30105	1M 5% 0.062W
3107	4822 051 30101	100Ω 5% 0.062W
3108	4822 051 30101	100Ω 5% 0.062W
3109	4822 051 30101	100Ω 5% 0.062W
3110	4822 051 30223	22k 5% 0.062W
3111	4822 051 30472	4k7 5% 0.062W
3112	4822 051 30472	4k7 5% 0.062W
3113	4822 051 30472	4k7 5% 0.062W
3114	4822 051 30472	4k7 5% 0.062W
3115	4822 051 30479	47Ω 5% 0.062W
3116	4822 051 30479	47Ω 5% 0.062W
3118	4822 051 30479	47Ω 5% 0.062W
3120	4822 051 30472	4k7 5% 0.062W
3121	4822 051 30472	4k7 5% 0.062W
3122	4822 051 30223	22k 5% 0.062W
3123	4822 051 30472	4k7 5% 0.062W
3124	4822 051 30221	220Ω 5% 0.062W
3125	4822 051 30008	0Ω jumper
3127	4822 051 30479	47Ω 5% 0.062W
3128	4822 051 30479	47Ω 5% 0.062W
3129	4822 051 30479	47Ω 5% 0.062W
3130	4822 051 30479	47Ω 5% 0.062W
3131	4822 051 30479	47Ω 5% 0.062W
3132	4822 051 30472	4k7 5% 0.062W
3135	4822 051 30008	0Ω jumper
3136	4822 051 30332	3k3 5% 0.062W
3137	4822 051 30332	3k3 5% 0.062W
3138	4822 051 30332	3k3 5% 0.062W
3140	4822 051 30332	3k3 5% 0.062W
3148	4822 051 30272	2k7 5% 0.062W
3149	4822 051 30101	100Ω 5% 0.062W
3150	4822 051 30472	4k7 5% 0.062W
3200	4822 051 30103	10k 5% 0.062W
3201	5322 117 13034	1k5 1% 0.063W
3203	4822 117 13632	100k 1% 0.62W
3204	4822 117 12891	220k 1% ERJ3Ω
3205	4822 051 30102	1k 5% 0.062W
3207	4822 051 30332	3k3 5% 0.062W
3208	4822 051 30472	4k7 5% 0.062W
3209	4822 051 30151	150Ω 5% 0.062W
3210	4822 117 12706	10k 1% 0.063W
3211	5322 117 13028	12k 1% 0.063W
3212	5322 117 13028	12k 1% 0.063W
3213	4822 117 12706	10k 1% 0.063W
3214	5322 117 13028	12k 1% 0.063W
3215	4822 051 30222	2k2 5% 0.062W
3216	4822 051 30472	4k7 5% 0.062W
3217	4822 051 30223	22k 5% 0.062W
3218	4822 051 30102	1k 5% 0.062W
3219	4822 051 30223	22k 5% 0.062W
3220	5322 117 13028	12k 1% 0.063W
3221	4822 117 12706	10k 1% 0.063W
3222	5322 117 13028	12k 1% 0.063W
3223	5322 117 13028	12k 1% 0.063W
3224	4822 117 12706	10k 1% 0.063W
3225	5322 117 13028	12k 1% 0.063W
3226	5322 117 13028	12k 1% 0.063W
3227	4822 117 12706	10k 1% 0.063W
3228	4822 117 12706	10k 1% 0.063W
3229	5322 117 13033	15k 1% 0.063W
3230	5322 117 13028	12k 1% 0.063W
3231	4822 117 12706	10k 1% 0.063W
3232	4822 117 12706	10k 1% 0.063W
3233	5322 117 13033	15k 1% 0.063W
3234	5322 117 13028	12k 1% 0.063W
3235	4822 117 12706	10k 1% 0.063W
3236	4822 117 12706	10k 1% 0.063W
3237	5322 117 13033	15k 1% 0.063W
3238	5322 117 13028	12k 1% 0.063W
3239	4822 117 12706	10k 1% 0.063W
3240	4822 117 12706	10k 1% 0.063W
3241	5322 117 13033	15k 1% 0.063W
3242	5322 117 13028	12k 1% 0.063W
3243	4822 117 12706	10k 1% 0.063W
3244	4822 117 12706	10k 1% 0.063W
3245	5322 117 13033	15k 1% 0.063W
3246	5322 117 13028	12k 1% 0.063W
3247	4822 117 12706	10k 1% 0.063W
3248	4822 117 12706	10k 1% 0.063W
3249	5322 117 13033	15k 1% 0.063W
3250	5322 117 13028	12k 1% 0.063W
3251	4822 117 12706	10k 1% 0.063W
3252	4822 117 12706	10k 1% 0.063W
3253	5322 117 13033	15k 1% 0.063W
3254	5322 117 13028	12k 1% 0.063W
3255	4822 117 12706	10k 1% 0.063W
3256	4822 117 12706	10k 1% 0.063W
3257	5322 117 13033	15k 1% 0.063W
3258	5322 117 13028	12k 1% 0.063W
3259	5322 117 13037	2k2 1% 0.063W
3260	5322 117 13018	1k0 1% 0.063W
3261	4822 051 30479	47Ω 5% 0.062W
3262	4822 051 30151	150Ω 5% 0.062W
3263	4822 051 30479	47Ω 5% 0.062W
3267	4822 051 30109	10Ω 5% 0.062W
3268	4822 051 30109	10Ω 5% 0.062W
3269	4822 051 30109	10Ω 5% 0.062W
3270	4822 051 30109	10Ω 5% 0.062W
3271	4822 051 30109	10Ω 5% 0.062W
3272	4822 051 30109	10Ω 5% 0.062W
3273	4822 051 30151	150Ω 5% 0.062W
3274	4822 117 12139	22Ω 5% 0.062W
3275	4822 117 12903	1k8 1% 0.063W
3276	4822 117 12903	1k8 1% 0.063W
3277	4822 117 12903	1k8 1% 0.063W
3278	4822 117 12903	1k8 1% 0.063W
3279	5322 117 13028	12k 1% 0.063W
3280	5322 117 13028	12k 1% 0.063W
3281	5322 117 13028	12k 1% 0.063W
3282	5322 117 13028	12k 1% 0.063W
3283	5322 117 13028	12k 1% 0.063W
3284	5322 117 13028	12k 1% 0.063W
3285	5322 117 13028	12k 1% 0.063W
3286	5322 117 13028	12k 1% 0.063W
3287	5322 117 13018	1k0 1% 0.063W
3288	4822 051 30273	27k 5% 0.062W
3289	4822 051 30472	4k7 5% 0.062W
3290	4822 117 12968	820Ω 5% 0.62W
3291	4822 051 30472	4k7 5% 0.062W
3300	4822 051 30472	4k7 5% 0.062W
3301	4822 051 30223	22k 5% 0.062W
3304	4822 051 30392	3k9 5% 0.063W
3306	4822 051 30109	10Ω 5% 0.062W
3307	4822 051 30273	27k 5% 0.062W
3309	4822 051 30392	3k9 5% 0.063W
3310	4822 051 30471	470Ω 5% 0.062W
3311	4822 051 30272	2k7 5% 0.062W

3312	4822 051 30471	470Ω 5% 0.062W
3313	4822 051 30272	2k7 5% 0.062W
3314	4822 051 30103	10k 5% 0.062W
3315	4822 051 30103	10k 5% 0.062W
3316	4822 051 30471	470Ω 5% 0.062W
3317	4822 051 30272	2k7 5% 0.062W
3320	4822 051 30471	470Ω 5% 0.062W
3321	4822 051 30272	2k7 5% 0.062W
3322	4822 051 30103	10k 5% 0.062W
3323	4822 051 30103	10k 5% 0.062W
3326	4822 051 30392	3k9 5% 0.063W
3330	4822 051 30471	470Ω 5% 0.062W
3331	4822 051 30272	2k7 5% 0.062W
3333	4822 051 30392	3k9 5% 0.063W
3335	4822 051 30471	470Ω 5% 0.062W
3336	4822 051 30272	2k7 5% 0.062W
3337	4822 051 30103	10k 5% 0.062W
3338	4822 051 30103	10k 5% 0.062W
3341	4822 051 30109	10Ω 5% 0.062W
3342	4822 051 30109	10Ω 5% 0.062W
3345	4822 051 30109	10Ω 5% 0.062W
3346	4822 051 30109	10Ω 5% 0.062W
3400	4822 051 30472	4k7 5% 0.062W
3401	4822 051 30472	4k7 5% 0.062W
3402	4822 051 30472	4k7 5% 0.062W
3403	4822 051 30472	4k7 5% 0.062W
3404	4822 051 30472	4k7 5% 0.062W
3405	4822 051 30472	4k7 5% 0.062W
3407	4822 051 30392	3k9 5% 0.063W
3410	4822 051 30471	470Ω 5% 0.062W
3411	4822 051 30222	2k2 5% 0.062W
3412	4822 051 30272	2k7 5% 0.062W
3413	4822 051 30472	4k7 5% 0.062W
3414	4822 051 30222	2k2 5% 0.062W
3415	4822 051 30471	470Ω 5% 0.062W
3416	4822 051 30272	2k7 5% 0.062W
3417	4822 051 30103	10k 5% 0.062W
3418	4822 051 30103	10k 5% 0.062W
3422	4822 051 30109	10Ω 5% 0.062W
3426	4822 051 30109	10Ω 5% 0.062W
3427	4822 051 30472	4k7 5% 0.062W
3428	4822 117 13632	100k 1% 0.62W
3429	4822 051 30472	4k7 5% 0.062W
3430	4822 117 13632	100k 1% 0.62W
3431	4822 051 30472	4k7 5% 0.062W
3432	4822 117 13632	100k 1% 0.62W
3433	4822 051 30472	4k7 5% 0.062W
3434	4822 117 13632	100k 1% 0.62W
3435	4822 051 30472	4k7 5% 0.062W
3436	4822 117 13632	100k 1% 0.62W
3500	4822 051 30759	75Ω 5% 0.062W
3501	4822 051 30759	75Ω 5% 0.062W
3502	4822 051 30759	75Ω 5% 0.062W
3503	4822 051 30759	75Ω 5% 0.062W
3505	4822 117 11151	1Ω 5%
3507	4822 051 30223	22k 5% 0.062W
3508	4822 051 30222	2k2 5% 0.062W
3509	4822 051 30223	22k 5% 0.062W
3510	4822 051 30272	2k7 5% 0.062W
3511	4822 051 30221	220Ω 5% 0.062W
3512	4822 051 30221	220Ω 5% 0.062W
3513	4822 051 30272	2k7 5% 0.062W
3514	4822 051 30759	75Ω 5% 0.062W
3515	4822 051 30221	220Ω 5% 0.062W
3516	4822 051 30153	15k 5% 0.062W
3517	4822 051 30103	10k 5% 0.062W
3518	4822 117 11151	1Ω 5%
3519	4822 117 11151	1Ω 5%
3520	4822 051 30223	22k 5% 0.062W
3521	4822 051 30102	1k 5% 0.062W
3522	4822 117 12925	47k 1% 0.063W
3523	4822 051 30759	75Ω 5% 0.062W
3524	4822 051 30759	75Ω 5% 0.062W
3525	4822 051 30759	75Ω 5% 0.062W
3526	4822 051 30759	75Ω 5% 0.062W
3527	4822 051 30101	100Ω 5% 0.062W
3528	5322 117 13037	2k2 1% 0.063W
3529	5322 117 13037	2k2 1% 0.063W
3530	4822 051 30759	75Ω 5% 0.062W
3531	5322 117 13018	1k0 1% 0.063W
3532	5322 117 13018	1k0 1% 0.063W
3533	4822 051 30109	10Ω 5% 0.062W
3534	5322 117 13034	1k5 1% 0.063W
3535	4822 117 12968	820Ω 5% 0.62W
3536	5322 117 13037	2k2 1% 0.063W
3537	5322 117 13018	1k0 1% 0.063W
3538	5322 117 13018	1k0 1% 0.063W
3539	5322 117 13036	1k2 1% 0.063W
3540	4822 051 30759	75Ω 5% 0.062W
3541	4822 051 30759	75Ω 5% 0.062W
3542	4822 051 30561	560Ω 5% 0.062W
3543	5322 117 13031	5k6 1% 0.063W
3544	4822 051 30689	68Ω 5% 0.063W
3545	4822 051 30101	100Ω 5% 0.062W
3546	4822 051 30101	100Ω 5% 0.062W
3550	5322 117 13018	1k0 1% 0.063W
3551	4822 117 12902	8k2 1% 0.063W
3552	5322 117 13018	1k0 1% 0.063W
3553	4822 051 30759	75Ω 5% 0.062W
3554	4822 051 30759	75Ω 5% 0.062W
3555	4822 051 30759	75Ω 5% 0.062W
3556	4822 051 30759	75Ω 5% 0.062W
3557	4822 051 30102	1k 5% 0.062W

∿

5201	2422 535 94092	IND FXD SM 0805 33U
5202	2422 535 94092	IND FXD SM 0805 33U
5203	2422 535 94092	IND FXD SM 0805 33U
5501	4822 242 10756	DSS306-92Y5S221M100
5503	2422 535 94092	IND FXD SM 0805 33U
5504	2422 535 94092	IND FXD SM 0805 33U
5506	4822 157 70601	100µH (920927085A)
5507	2422 535 94092	IND FXD SM 0805 33U
5508	2422 535 94092	IND FXD SM 0805 33U
5509	4822 157 11074	100µH

▶|

6300	4822 130 11397	BAS316
6500	4822 130 11522	UDZ15B
6501	4822 130 11522	UDZ15B
6502	4822 130 11522	UDZ15B
6503	4822 130 11522	UDZ15B
6504	4822 130 11522	UDZ15B
6506	4822 130 11522	UDZ15B
6507	4822 130 11522	UDZ15B
6508	4822 130 11522	UDZ15B
6509	4822 130 11522	UDZ15B
6510	9340 548 42115	PDZ2.4B

⊗ ▭

7100	9965 000 06673	TC7WHU04FU
7101	9965 000 06673	TC7WHU04FU
7103	9352 499 60118	IC SM 74LVC00AD
7104	9352 499 60118	IC SM 74LVC00AD
7105	4822 209 17441	74LVC74AD
7106	4822 209 17455	74LVC157AD
7107	5322 209 11578	PCF8574T
7120	4822 130 60511	BC847B
7122	9965 000 04199	BSN20
7123	9965 000 04199	BSN20
7126	4822 130 60511	BC847B
7200	9965 000 06675	CS4397 24BIT 192KHZ DAC
7201	9322 171 68668	IC SM CS4392-KZ
7202	9322 171 68668	IC SM CS4392-KZ
7203	9322 124 43668	IC SM LM317MDT (ST00) R
7204	9322 179 99668	OPA2228U
7205	9352 202 10118	IC SM NE5532AD8
7206	9352 202 10118	IC SM NE5532AD8
7220	4822 130 60511	BC847B
7221	4822 130 60511	BC847B
7222	4822 130 60511	BC847B
7224	5322 130 60845	BC807-25
7225	4822 130 60511	BC847B
7300	5322 209 14481	HEF4053BT
7302	4822 209 30095	LM833D
7303	4822 209 30095	LM833D
7304	9352 202 10118	IC SM NE5532AD8
7305	9322 067 00668	IC SM OP275GS (ANA0) R
7306	5322 209 14481	HEF4053BT
7307	9352 202 10118	IC SM NE5532AD8
7320	4822 130 42804	BC817-25
7321	4822 130 60511	BC847B
7322	4822 130 42804	BC817-25
7323	4822 130 42804	BC817-25
7324	4822 130 42804	BC817-25
7325	4822 130 42804	BC817-25
7326	4822 130 42804	BC817-25
7327	4822 130 42804	BC817-25
7400	5322 209 14481	HEF4053BT
7401	9352 202 10118	IC SM NE5532AD8
7402	9352 202 10118	IC SM NE5532AD8
7403	9352 202 10118	IC SM NE5532AD8
7404	9352 202 10118	IC SM NE5532AD8
7408	9352 202 10118	IC SM NE5532AD8
7420	4822 130 42804	BC817-25
7421	4822 130 42804	BC817-25
7500	9322 165 60668	IC SM LA7109 (TSAJ) R
7503	4822 209 17398	LD1117DT33
7504	9322 141 80668	AD8073JR
7520	4822 130 60511	BC847B
7521	4822 130 60511	BC847B
7522	4822 130 60511	BC847B
7523	4822 130 60511	BC847B
7524	4822 130 60511	BC847B
7525	4822 130 60373	BC856B
7526	4822 130 60511	BC847B
7604	9322 155 28667	OPT FIB CON GP1FA550TZ

AV PWB DVD962SA /171 /691

Various

1102	2422 543 01283	RES XTL 16MHz 9344 NR-2C Y
1300	2422 132 06532	RELAY 2P 12V 2A DS2Y-S B
1400	2422 025 17409	CON BM V 24P F 1.00 FFC 0.3 B
1401	2422 026 05189	CON BM CINCH H 4P F YEWHRD B
1402	2422 026 05088	CON BM CINCH H 6P F B
1404	2422 025 16525	CON BM V 16P F 1.00 FFC 0.3 R
1405	4822 265 11154	52030-2210 (22P)
1408	2422 026 05188	CON BM MDIN H 3P F TCS7927 B
1409	2422 026 05191	CON BM CINCH H 3P F RDBUGN B
1410	4822 267 31626	
1411	4822 265 11154	52030-2210 (22P)
1412	2422 025 08149	CON BM V 6P M 2.00 PH B
1600	2422 543 01255	RES XTL SM 24MHz 576 30P AT-51R

⊣⊢

2100	4822 126 14305	100nF 10% 16V
2101	4822 122 33777	47pF 5% 63V
2102	4822 122 33761	22pF 5% 50V
2103	4822 122 33752	15pF 5% 50V
2104	4822 122 33761	22pF 5% 50V
2105	4822 122 33761	22pF 5% 50V
2106	4822 122 33752	15pF 5% 50V
2107	4822 122 33752	15pF 5% 50V
2108	4822 126 14305	100nF 10% 16V
2109	4822 126 14305	100nF 10% 16V
2110	4822 126 14305	100nF 10% 16V
2112	4822 126 14305	100nF 10% 16V
2113	4822 126 14305	100nF 10% 16V
2114	4822 124 11947	10µF 20% 16V
2116	4822 126 14305	100nF 10% 16V
2117	4822 126 14305	100nF 10% 16V
2200	4822 126 14305	100nF 10% 16V
2201	4822 126 14305	100nF 10% 16V
2202	4822 124 11947	10µF 20% 16V
2203	4822 126 14305	100nF 10% 16V
2204	4822 126 14305	100nF 10% 16V
2205	4822 126 14305	100nF 10% 16V
2206	4822 124 11947	10µF 20% 16V
2207	4822 126 14305	100nF 10% 16V
2208	4822 126 14305	100nF 10% 16V
2209	4822 126 14305	100nF 10% 16V
2210	4822 126 14305	100nF 10% 16V
2211	4822 126 14305	100nF 10% 16V
2212	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2213	3198 028 41090	10µF 20% 35V
2214	4822 126 14305	100nF 10% 16V
2215	4822 126 14305	100nF 10% 16V
2216	4822 124 21913	1µF 20% 63V
2217	4822 124 21913	1µF 20% 63V
2218	4822 126 14305	100nF 10% 16V
2219	4822 124 11947	10µF 20% 16V
2220	4822 126 14305	100nF 10% 16V
2221	4822 126 14249	560pF 10% 50V
2222	4822 122 31765	100pF 2% 63V
2223	4822 126 14305	100nF 10% 16V
2224	4822 122 31765	100pF 2% 63V
2225	4822 126 14305	100nF 10% 16V
2226	4822 124 21913	1µF 20% 63V
2227	4822 124 21913	1µF 20% 63V
2228	4822 124 11947	10µF 20% 16V
2229	4822 126 14305	100nF 10% 16V
2230	2020 012 93792	100µF 16V
2231	4822 126 14249	560pF 10% 50V
2232	4822 122 31765	100pF 2% 63V
2233	4822 126 14249	560pF 10% 50V
2234	4822 122 31765	100pF 2% 63V
2235	2020 012 93792	100µF 16V
2236	4822 126 14249	560pF 10% 50V
2237	4822 126 14226	82pF 5% 50V
2238	4822 126 13881	470pF 5% 50V
2239	4822 126 14241	0603 50V 330P COL R
2240	4822 126 14305	100nF 10% 16V
2241	4822 126 14305	100nF 10% 16V

2242	4822 126 14226	82pF 5% 50V
2243	4822 126 13881	470pF 5% 50V
2244	4822 124 22339	100UE 16V
2245	4822 126 14241	0603 50V 330P COL R
2246	4822 126 13881	470pF 5% 50V
2247	4822 126 14241	0603 50V 330P COL R
2248	4822 126 14226	82pF 5% 50V
2249	4822 126 14241	0603 50V 330P COL R
2250	4822 126 14226	82pF 5% 50V
2251	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2252	4822 126 13881	470pF 5% 50V
2253	4822 126 14305	100nF 10% 16V
2254	4822 126 14241	0603 50V 330P COL R
2255	4822 126 13881	470pF 5% 50V
2256	4822 126 14226	82pF 5% 50V
2257	4822 126 14305	100nF 10% 16V
2258	4822 126 14226	82pF 5% 50V
2259	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2260	4822 126 13881	470pF 5% 50V
2261	4822 126 14241	0603 50V 330P COL R
2262	4822 126 14241	0603 50V 330P COL R
2263	4822 126 13881	470pF 5% 50V
2264	4822 126 14226	82pF 5% 50V
2265	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2266	4822 126 14226	82pF 5% 50V
2267	4822 126 13881	470pF 5% 50V
2268	4822 126 14241	0603 50V 330P COL R
2269	4822 124 11947	10µF 20% 16V
2270	4822 126 14305	100nF 10% 16V
2271	4822 124 22651	1.0µF 20% 50V
2272	4822 124 22651	1.0µF 20% 50V
2273	4822 124 22651	1.0µF 20% 50V
2275	4822 126 14305	100nF 10% 16V
2276	4822 126 14305	100nF 10% 16V
2300	4822 126 14305	100nF 10% 16V
2301	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2302	4822 126 14305	100nF 10% 16V
2303	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2304	4822 126 14305	100nF 10% 16V
2306	4822 126 14305	100nF 10% 16V
2307	5322 121 42661	330nF 5% 63V
2308	4822 124 11947	10µF 20% 16V
2309	5322 121 42661	330nF 5% 63V
2310	4822 122 31765	100pF 2% 63V
2311	4822 122 31765	100pF 2% 63V
2313	4822 122 31765	100pF 2% 63V
2314	4822 122 31765	100pF 2% 63V
2315	4822 126 14305	100nF 10% 16V
2316	4822 126 14305	100nF 10% 16V
2317	5322 121 42661	330nF 5%.63V
2318	5322 121 42661	330nF 5% 63V
2319	4822 122 31765	100pF 2% 63V
2320	4822 122 31765	100pF 2% 63V
2321	4822 126 14305	100nF 10% 16V
2332	4822 126 14305	100nF 10% 16V
2333	4822 124 22339	100UE 16V
2334	4822 124 22339	100UE 16V
2335	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2336	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2337	4822 126 14305	100nF 10% 16V
2338	4822 126 14305	100nF 10% 16V
2339	4822 126 14305	100nF 10% 16V
2340	4822 126 14305	100nF 10% 16V
2400	4822 126 14305	100nF 10% 16V
2401	4822 126 14305	100nF 10% 16V
2402	4822 126 14305	100nF 10% 16V
2403	4822 126 14305	100nF 10% 16V
2404	4822 126 14305	100nF 10% 16V
2405	4822 126 14305	100nF 10% 16V
2406	4822 126 14305	100nF 10% 16V
2407	4822 126 14305	100nF 10% 16V
2408	5322 121 42661	330nF 5% 63V
2409	4822 126 14305	100nF 10% 16V
2410	4822 122 31765	100pF 2% 63V
2411	4822 122 31765	100pF 2% 63V
2412	4822 126 14305	100nF 10% 16V
2413	4822 121 42408	220nF 5% 63V
2414	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2415	4822 124 22339	100UE 16V
2416	4822 126 14305	100nF 10% 16V
2417	4822 126 14305	100nF 10% 16V
2441	4822 126 14305	100nF 10% 16V
2500	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2501	4822 126 14305	100nF 10% 16V
2502	4822 126 14305	100nF 10% 16V
2503	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2504	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2505	4822 126 14305	100nF 10% 16V
2506	3198 017 44740	0603 10V 470nF COL
2508	4822 124 40184	1000µF 20% 10V
2516	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2517	4822 124 11947	10µF 20% 16V
2518	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2519	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2528	4822 126 13883	220pF 5% 50V
2529	4822 126 13883	220pF 5% 50V
2530	4822 126 13883	220pF 5% 50V
2531	3198 016 36810	0603 25V 680P COL R
2532	4822 126 13883	220pF 5% 50V
2533	4822 126 14494	22nF 10% 25V
2534	4822 126 14494	22nF 10% 25V
2535	4822 126 13883	220pF 5% 50V
2536	4822 124 11947	10µF 20% 16V
2537	4822 126 14305	100nF 10% 16V
2538	4822 122 33777	47pF 5% 63V
2540	4822 122 33777	47pF 5% 63V
2541	4822 126 13883	220pF 5% 50V
2542	4822 124 80231	47µF 20% 16V
2543	4822 124 80231	47µF 20% 16V
2544	4822 124 80231	47µF 20% 16V
2545	4822 124 80231	47µF 20% 16V
2546	5322 126 11583	10nF 10% 50V
2549	4822 124 80791	470µF 16V 20% 105C DXH=8X11.5
2550	4822 124 80791	470µF 16V 20% 105C DXH=8X11.5
2600	4822 126 14305	100nF 10% 16V
2601	4822 126 14305	100nF 10% 16V
2602	4822 126 14305	100nF 10% 16V
2603	4822 126 14305	100nF 10% 16V
2604	4822 126 14305	100nF 10% 16V
2605	4822 126 14305	100nF 10% 16V
2606	4822 124 11947	10µF 20% 16V
2607	4822 124 11947	10µF 20% 16V
2608	4822 124 11947	10µF 20% 16V
2609	4822 126 14305	100nF 10% 16V
2610	4822 126 14305	100nF 10% 16V
2611	4822 126 14305	100nF 10% 16V
2612	4822 126 14305	100nF 10% 16V
2613	3198 024 44730	47nF 50V
2614	3198 024 44730	47nF 50V
2615	3198 024 44730	47nF 50V
2616	3198 024 44730	47nF 50V
2617	3198 024 44730	47nF 50V
2618	3198 024 44730	47nF 50V
2619	3198 024 44730	47nF 50V
2620	3198 024 44730	47nF 50V
2621	3198 024 44730	47nF 50V
2622	3198 024 44730	47nF 50V
2623	3198 024 44730	47nF 50V
2624	3198 024 44730	47nF 50V
2625	3198 024 44730	47nF 50V
2626	3198 024 44730	47nF 50V
2627	3198 024 44730	47nF 50V
2628	3198 024 44730	47nF 50V
2629	3198 024 44730	47nF 50V
2630	3198 024 44730	47nF 50V
2631	3198 024 44730	47nF 50V
2632	3198 024 44730	47nF 50V
2634	4822 122 33741	10pF 10% 50V
2635	4822 122 33741	10pF 10% 50V
2638	4822 126 14305	100nF 10% 16V
2639	4822 126 14305	100nF 10% 16V
2640	4822 126 14305	100nF 10% 16V
2641	4822 126 14305	100nF 10% 16V
2642	4822 126 14305	100nF 10% 16V
2643	4822 126 14305	100nF 10% 16V
2644	4822 126 14305	100nF 10% 16V
2645	4822 126 14305	100nF 10% 16V
2646	4822 126 14305	100nF 10% 16V
2647	4822 126 14305	100nF 10% 16V
2648	4822 126 14305	100nF 10% 16V
2649	4822 126 14305	100nF 10% 16V
2650	4822 126 14305	100nF 10% 16V

-▭-

3100	4822 051 30101	100Ω 5% 0.062W
3101	4822 051 30109	10Ω 5% 0.062W
3102	4822 051 30101	100Ω 5% 0.062W
3103	4822 051 30101	100Ω 5% 0.062W
3104	4822 051 30101	100Ω 5% 0.062W
3105	4822 051 30101	100Ω 5% 0.062W
3106	4822 051 30105	1M 5% 0.062W
3107	4822 051 30101	100Ω 5% 0.062W
3108	4822 051 30101	100Ω 5% 0.062W
3109	4822 051 30101	100Ω 5% 0.062W
3110	4822 051 30223	22k 5% 0.062W
3111	4822 051 30472	4k7 5% 0.062W
3112	4822 051 30472	4k7 5% 0.062W
3113	4822 051 30472	4k7 5% 0.062W
3114	4822 051 30472	4k7 5% 0.062W
3115	4822 051 30479	47Ω 5% 0.062W
3116	4822 051 30479	47Ω 5% 0.062W
3118	4822 051 30479	47Ω 5% 0.062W
3120	4822 051 30472	4k7 5% 0.062W
3121	4822 051 30472	4k7 5% 0.062W
3122	4822 051 30223	22k 5% 0.062W
3123	4822 051 30472	4k7 5% 0.062W
3124	4822 051 30221	220Ω 5% 0.062W
3125	4822 051 30008	0Ω jumper
3127	4822 051 30479	47Ω 5% 0.062W
3128	4822 051 30479	47Ω 5% 0.062W
3129	4822 051 30479	47Ω 5% 0.062W
3130	4822 051 30479	47Ω 5% 0.062W
3131	4822 051 30479	47Ω 5% 0.062W
3132	4822 051 30472	4k7 5% 0.062W
3135	4822 051 30008	0Ω jumper
3136	4822 051 30332	3k3 5% 0.062W
3137	4822 051 30332	3k3 5% 0.062W
3138	4822 051 30332	3k3 5% 0.062W
3140	4822 051 30332	3k3 5% 0.062W
3142	4822 051 30332	3k3 5% 0.062W
3143	4822 051 30332	3k3 5% 0.062W
3145	4822 051 30332	3k3 5% 0.062W
3146	4822 051 30332	3k3 5% 0.062W
3148	4822 051 30272	2k7 5% 0.062W
3149	4822 051 30101	100Ω 5% 0.062W
3150	4822 051 30472	4k7 5% 0.062W
3200	4822 051 30103	10k 5% 0.062W
3201	5322 117 13034	1k5 1% 0.063W
3203	4822 117 13632	100k 1% 0.62W
3204	4822 117 12891	220k 1% ERJ3Ω
3205	4822 051 30102	1k 5% 0.062W
3207	4822 051 30332	3k3 5% 0.062W
3208	4822 051 30472	4k7 5% 0.062W
3209	4822 051 30151	150Ω 5% 0.062W
3210	4822 117 12706	10k 1% 0.063W
3211	5322 117 13028	12k 1% 0.063W
3212	5322 117 13028	12k 1% 0.063W
3213	4822 117 12706	10k 1% 0.063W
3214	5322 117 13028	12k 1% 0.063W
3215	4822 051 30222	2k2 5% 0.062W
3216	4822 051 30472	4k7 5% 0.062W
3217	4822 051 30223	22k 5% 0.062W
3218	4822 051 30102	1k 5% 0.062W
3219	4822 051 30223	22k 5% 0.062W
3220	5322 117 13028	12k 1% 0.063W
3221	4822 117 12706	10k 1% 0.063W
3222	5322 117 13028	12k 1% 0.063W
3223	5322 117 13028	12k 1% 0.063W
3224	4822 117 12706	10k 1% 0.063W
3225	5322 117 13028	12k 1% 0.063W
3226	5322 117 13028	12k 1% 0.063W
3227	4822 117 12706	10k 1% 0.063W
3228	4822 117 12706	10k 1% 0.063W
3229	5322 117 13033	15k 1% 0.063W
3230	5322 117 13028	12k 1% 0.063W
3231	4822 117 12706	10k 1% 0.063W
3232	4822 117 12706	10k 1% 0.063W
3233	5322 117 13033	15k 1% 0.063W
3234	5322 117 13028	12k 1% 0.063W
3235	4822 117 12706	10k 1% 0.063W
3236	4822 117 12706	10k 1% 0.063W
3237	5322 117 13033	15k 1% 0.063W
3238	5322 117 13028	12k 1% 0.063W
3239	4822 117 12706	10k 1% 0.063W
3240	4822 117 12706	10k 1% 0.063W
3241	5322 117 13033	15k 1% 0.063W
3242	5322 117 13028	12k 1% 0.063W
3243	4822 117 12706	10k 1% 0.063W
3244	4822 117 12706	10k 1% 0.063W
3245	5322 117 13033	15k 1% 0.063W
3246	5322 117 13028	12k 1% 0.063W
3247	4822 117 12706	10k 1% 0.063W
3248	4822 117 12706	10k 1% 0.063W
3249	5322 117 13033	15k 1% 0.063W
3250	5322 117 13028	12k 1% 0,063W
3251	4822 117 12706	10k 1% 0.063W
3252	4822 117 12706	10k 1% 0.063W
3253	5322 117 13033	15k 1% 0.063W
3254	5322 117 13028	12k 1% 0.063W
3255	4822 117 12706	10k 1% 0.063W
3256	4822 117 12706	10k 1% 0.063W
3257	5322 117 13033	15k 1% 0.063W
3258	5322 117 13028	12k 1% 0.063W
3259	5322 117 13037	2k2 1% 0.063W

3260	5322 117 13018	1k0 1% 0.063W
3261	4822 051 30479	47Ω 5% 0.062W
3262	4822 051 30151	150Ω 5% 0.062W
3263	4822 051 30479	47Ω 5% 0.062W
3267	4822 051 30109	10Ω 5% 0.062W
3268	4822 051 30109	10Ω 5% 0.062W
3269	4822 051 30109	10Ω 5% 0.062W
3270	4822 051 30109	10Ω 5% 0.062W
3271	4822 051 30109	10Ω 5% 0.062W
3272	4822 051 30109	10Ω 5% 0.062W
3273	4822 051 30151	150Ω 5% 0.062W
3274	4822 117 12139	22Ω 5% 0.062W
3275	4822 117 12903	1k8 1% 0.063W
3276	4822 117 12903	1k8 1% 0.063W
3277	4822 117 12903	1k8 1% 0.063W
3278	4822 117 12903	1k8 1% 0.063W
3279	5322 117 13028	12k 1% 0.063W
3280	5322 117 13028	12k 1% 0.063W
3281	5322 117 13028	12k 1% 0.063W
3282	5322 117 13028	12k 1% 0.063W
3283	5322 117 13028	12k 1% 0.063W
3284	5322 117 13028	12k 1% 0.063W
3285	5322 117 13028	12k 1% 0.063W
3286	5322 117 13028	12k 1% 0.063W
3287	5322 117 13018	1k0 1% 0.063W
3288	4822 051 30273	27k 5% 0.062W
3289	4822 051 30472	4k7 5% 0.062W
3290	4822 117 12968	820Ω 5% 0.62W
3291	4822 051 30472	4k7 5% 0.062W
3300	4822 051 30472	4k7 5% 0.062W
3301	4822 051 30223	22k 5% 0.062W
3304	4822 051 30392	3k9 5% 0.063W
3306	4822 051 30109	10Ω 5% 0.062W
3307	4822 051 30273	27k 5% 0.062W
3309	4822 051 30392	3k9 5% 0.063W
3310	4822 051 30471	470Ω 5% 0.062W
3311	4822 051 30272	2k7 5% 0.062W
3312	4822 051 30471	470Ω 5% 0.062W
3313	4822 051 30272	2k7 5% 0.062W
3314	4822 051 30103	10k 5% 0.062W
3315	4822 051 30103	10k 5% 0.062W
3316	4822 051 30471	470Ω 5% 0.062W
3317	4822 051 30272	2k7 5% 0.062W
3320	4822 051 30471	470Ω 5% 0.062W
3321	4822 051 30272	2k7 5% 0.062W
3322	4822 051 30103	10k 5% 0.062W
3323	4822 051 30103	10k 5% 0.062W
3326	4822 051 30392	3k9 5% 0.063W
3330	4822 051 30471	470Ω 5% 0.062W
3331	4822 051 30272	2k7 5% 0.062W
3333	4822 051 30392	3k9 5% 0.063W
3335	4822 051 30471	470Ω 5% 0.062W
3336	4822 051 30272	2k7 5% 0.062W
3337	4822 051 30103	10k 5% 0.062W
3338	4822 051 30103	10k 5% 0.062W
3341	4822 051 30109	10Ω 5% 0.062W
3342	4822 051 30109	10Ω 5% 0.062W
3345	4822 051 30109	10Ω 5% 0.062W
3346	4822 051 30109	10Ω 5% 0.062W
3400	4822 051 30472	4k7 5% 0.062W
3401	4822 051 30472	4k7 5% 0.062W
3402	4822 051 30472	4k7 5% 0.062W
3403	4822 051 30472	4k7 5% 0.062W
3404	4822 051 30472	4k7 5% 0.062W
3405	4822 051 30472	4k7 5% 0.062W
3407	4822 051 30392	3k9 5% 0.063W
3410	4822 051 30471	470Ω 5% 0.062W
3411	4822 051 30222	2k2 5% 0.062W
3412	4822 051 30272	2k7 5% 0.062W
3413	4822 051 30472	4k7 5% 0.062W
3414	4822 051 30222	2k2 5% 0.062W
3415	4822 051 30471	470Ω 5% 0.062W
3416	4822 051 30272	2k7 5% 0.062W
3417	4822 051 30103	10k 5% 0.062W
3418	4822 051 30103	10k 5% 0.062W
3422	4822 051 30109	10Ω 5% 0.062W
3426	4822 051 30109	10Ω 5% 0.062W
3427	4822 051 30472	4k7 5% 0.062W
3428	4822 117 13632	100k 1% 0.62W
3429	4822 051 30472	4k7 5% 0.062W
3430	4822 117 13632	100k 1% 0.62W
3431	4822 051 30472	4k7 5% 0.062W
3432	4822 117 13632	100k 1% 0.62W
3433	4822 051 30472	4k7 5% 0.062W
3434	4822 117 13632	100k 1% 0.62W
3435	4822 051 30472	4k7 5% 0.062W
3436	4822 117 13632	100k 1% 0.62W
3500	4822 051 30759	75Ω 5% 0.062W
3501	4822 051 30759	75Ω 5% 0.062W
3502	4822 051 30759	75Ω 5% 0.062W
3503	4822 051 30759	75Ω 5% 0.062W
3505	4822 117 11151	1Ω 5%
3507	4822 051 30223	22k 5% 0.062W
3508	4822 051 30222	2k2 5% 0.062W
3509	4822 051 30223	22k 5% 0.062W
3516	4822 051 30153	15k 5% 0.062W
3517	4822 051 30103	10k 5% 0.062W
3518	4822 117 11151	1Ω 5%
3519	4822 117 11151	1Ω 5%
3523	4822 051 30759	75Ω 5% 0.062W
3524	4822 051 30759	75Ω 5% 0.062W
3525	4822 051 30759	75Ω 5% 0.062W
3526	4822 051 30759	75Ω 5% 0.062W
3527	4822 051 30101	100Ω 5% 0.062W
3528	5322 117 13037	2k2 1% 0.063W
3529	5322 117 13037	2k2 1% 0.063W
3530	4822 051 30759	75Ω 5% 0.062W
3531	5322 117 13018	1k0 1% 0.063W
3532	5322 117 13018	1k0 1% 0.063W
3533	4822 051 30109	10Ω 5% 0.062W
3534	5322 117 13034	1k5 1% 0.063W
3535	4822 117 12968	820Ω 5% 0.62W
3536	5322 117 13037	2k2 1% 0.063W
3537	5322 117 13018	1k0 1% 0.063W
3538	5322 117 13018	1k0 1% 0.063W
3539	5322 117 13036	1k2 1% 0.063W
3540	4822 051 30759	75Ω 5% 0.062W
3541	4822 051 30759	75Ω 5% 0.062W
3542	4822 051 30561	560Ω 5% 0.062W
3543	5322 117 13031	5k6 1% 0.063W
3544	4822 051 30689	68Ω 5% 0.063W
3545	4822 051 30101	100Ω 5% 0.062W
3546	4822 051 30101	100Ω 5% 0.062W
3550	5322 117 13018	1k0 1% 0.063W
3551	4822 117 12902	8k2 1% 0.063W
3552	5322 117 13018	1k0 1% 0.063W
3553	4822 051 30759	75Ω 5% 0.062W
3554	4822 051 30759	75Ω 5% 0.062W
3555	4822 051 30759	75Ω 5% 0.062W
3556	4822 051 30759	75Ω 5% 0.062W
3557	4822 051 30102	1k0 1% 0.063W
3600	4822 051 30008	0Ω jumper
3601	4822 051 30472	4k7 5% 0.062W
3602	4822 051 30008	0Ω jumper
3610	4822 051 30569	56Ω 5% 0.062W
3611	4822 051 30759	75Ω 5% 0.062W
3614	4822 051 30759	75Ω 5% 0.062W
3618	4822 051 30759	75Ω 5% 0.062W
3619	2322 702 60189	RST SM RC21 18Ω PM5 R
3620	4822 051 30109	10Ω 5% 0.062W
3621	4822 051 30109	10Ω 5% 0.062W
3622	4822 051 30109	10Ω 5% 0.062W
3623	4822 051 30008	0Ω jumper
3624	4822 051 30101	100Ω 5% 0.062W
3625	4822 051 30101	100Ω 5% 0.062W

5201	2422 535 94092	IND FXD SM 0805 33U PM10 R
5202	2422 535 94092	IND FXD SM 0805 33U PM10 R
5203	2422 535 94092	IND FXD SM 0805 33U PM10 R
5501	4822 242 10756	DSS306-92Y5S221M100
5503	2422 535 94092	IND FXD SM 0805 33U PM10 R
5504	2422 535 94092	IND FXD SM 0805 33U PM10 R
5506	4822 157 70601	100µH (920927085A)
5507	2422 535 94092	IND FXD SM 0805 33U PM10 R
5508	2422 535 94092	IND FXD SM 0805 33U PM10 R
5509	4822 157 11074	100µH
5600	4822 157 10586	2.2µH 10% 0805
5601	4822 157 10586	2.2µH 10% 0805
5602	4822 157 10586	2.2µH 10% 0805
5604	4822 157 10586	2.2µH 10% 0805

6300	4822 130 11397	BAS316
6506	4822 130 11522	UDZ15B
6507	4822 130 11522	UDZ15B
6508	4822 130 11522	UDZ15B

7100	9965 000 06673	TC7WHU04FU
7101	9965 000 06673	TC7WHU04FU
7103	9352 499 60118	IC SM 74LVC00AD (PHSE) R
7104	9352 499 60118	IC SM 74LVC00AD (PHSE) R
7105	4822 209 17441	74LVC74AD
7106	4822 209 17455	74LVC157AD
7107	5322 209 11578	PCF8574T
7120	4822 130 60511	BC847B
7122	9965 000 04199	BSN20
7123	9965 000 04199	BSN20
7124	9965 000 04199	BSN20
7125	9965 000 04199	BSN20
7126	4822 130 60511	BC847B
7200	9965 000 06675	CS4397 24BIT 192KHZ DAC
7201	9322 171 68668	IC SM CS4392-KZ (CILO) R
7202	9322 171 68668	IC SM CS4392-KZ (CILO) R
7203	9322 124 43668	IC SM LM317MDT (ST00) R
7204	9322 179 99668	IC SM OPA2228U (BBOO) R
7205	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7206	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7220	4822 130 60511	BC847B
7221	4822 130 60511	BC847B
7222	4822 130 60511	BC847B
7224	5322 130 60845	BC807-25
7225	4822 130 60511	BC847B
7300	5322 209 14481	HEF4053BT
7302	4822 209 30095	LM833D
7304	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7305	9322 067 00668	IC SM OP275GS (ANA0) R
7306	5322 209 14481	HEF4053BT
7307	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7320	4822 130 42804	BC817-25
7321	4822 130 60511	BC847B
7322	4822 130 42804	BC817-25
7323	4822 130 42804	BC817-25
7324	4822 130 42804	BC817-25
7325	4822 130 42804	BC817-25
7326	4822 130 42804	BC817-25
7327	4822 130 42804	BC817-25
7400	5322 209 14481	HEF4053BT
7401	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7402	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7403	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7404	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7408	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7420	4822 130 42804	BC817-25
7421	4822 130 42804	BC817-25
7500	9322 165 60668	IC SM LA7109 (TSAJ) R
7503	4822 209 17398	LD1117DT33
7504	9322 141 80668	AD8073JR
7520	4822 130 60511	BC847B
7521	4822 130 60511	BC847B
7522	4822 130 60511	BC847B
7600	9352 688 32557	IC SM SAA7118H/V1 (PHSE) Y
7601	4822 209 17398	LD1117DT33

AV PWB SACD900 /171

Various

1102	2422 543 01283	RES XTL 16MHz 9344 NR-2C Y
1300	2422 132 06532	RELAY 2P 12V 2A DS2Y-S B
1400	2422 025 17409	CON BM V 24P F 1.00 FFC 0.3 B
1401	2422 026 05189	CON BM CINCH H 4P F YEWHRD B
1402	2422 026 05088	CON BM CINCH H 6P F B
1404	2422 025 16525	CON BM V 16P F 1.00 FFC 0.3 R
1405	4822 265 11154	52030-2210 (22P)
1408	2422 026 05188	CON BM MDIN H 3P F TCS7927 B
1409	2422 026 05191	CON BM CINCH H 3P F RDBUGN B
1410	4822 267 31626	

2100	4822 126 14305	100nF 10% 16V
2101	4822 122 33777	47pF 5% 63V
2102	4822 122 33761	22pF 5% 50V
2103	4822 122 33752	15pF 5% 50V
2104	4822 122 33761	22pF 5% 50V
2105	4822 122 33761	22pF 5% 50V
2106	4822 122 33752	15pF 5% 50V

2107	4822 122 33752	15pF 5% 50V
2108	4822 126 14305	100nF 10% 16V
2109	4822 126 14305	100nF 10% 16V
2110	4822 126 14305	100nF 10% 16V
2112	4822 126 14305	100nF 10% 16V
2113	4822 126 14305	100nF 10% 16V
2114	4822 124 11947	10µF 20% 16V
2116	4822 126 14305	100nF 10% 16V
2117	4822 126 14305	100nF 10% 16V
2200	4822 126 14305	100nF 10% 16V
2201	4822 126 14305	100nF 10% 16V
2202	4822 124 11947	10µF 20% 16V
2203	4822 126 14305	100nF 10% 16V
2204	4822 126 14305	100nF 10% 16V
2205	4822 126 14305	100nF 10% 16V
2206	4822 124 11947	10µF 20% 16V
2207	4822 126 14305	100nF 10% 16V
2208	4822 126 14305	100nF 10% 16V
2209	4822 126 14305	100nF 10% 16V
2210	4822 126 14305	100nF 10% 16V
2211	4822 126 14305	100nF 10% 16V
2212	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2213	3198 028 41090	10µF 20% 35V
2214	4822 126 14305	100nF 10% 16V
2215	4822 126 14305	100nF 10% 16V
2216	4822 124 21913	1µF 20% 63V
2217	4822 124 21913	1µF 20% 63V
2218	4822 126 14305	100nF 10% 16V
2219	4822 124 11947	10µF 20% 16V
2220	4822 126 14305	100nF 10% 16V
2221	4822 126 14249	560pF 10% 50V
2222	4822 122 31765	100pF 2% 63V
2223	4822 126 14305	100nF 10% 16V
2224	4822 122 31765	100pF 2% 63V
2225	4822 126 14305	100nF 10% 16V
2226	4822 124 21913	1µF 20% 63V
2227	4822 124 21913	1µF 20% 63V
2228	4822 124 11947	10µF 20% 16V
2229	4822 126 14305	100nF 10% 16V
2230	2020 012 93792	100µF 16V
2231	4822 126 14249	560pF 10% 50V
2232	4822 122 31765	100pF 2% 63V
2233	4822 126 14249	560pF 10% 50V
2234	4822 122 31765	100pF 2% 63V
2235	2020 012 93792	100µF 16V
2236	4822 126 14249	560pF 10% 50V
2237	4822 126 14226	82pF 5% 50V
2238	4822 126 13881	470pF 5% 50V
2239	4822 126 14241	0603 50V 330P COL R
2240	4822 126 14305	100nF 10% 16V
2241	4822 126 14305	100nF 10% 16V
2242	4822 126 14226	82pF 5% 50V
2243	4822 126 13881	470pF 5% 50V
2244	4822 124 22339	100UE 16V
2245	4822 126 14241	0603 50V 330P COL R
2246	4822 126 13881	470pF 5% 50V
2247	4822 126 14241	0603 50V 330P COL R
2248	4822 126 14226	82pF 5% 50V
2249	4822 126 14241	0603 50V 330P COL R
2250	4822 126 14226	82pF 5% 50V
2251	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2252	4822 126 13881	470pF 5% 50V
2253	4822 126 14305	100nF 10% 16V
2254	4822 126 14241	0603 50V 330P COL R
2255	4822 126 13881	470pF 5% 50V
2256	4822 126 14226	82pF 5% 50V
2257	4822 126 14305	100nF 10% 16V
2258	4822 126 14226	82pF 5% 50V
2259	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2260	4822 126 13881	470pF 5% 50V
2261	4822 126 14241	0603 50V 330P COL R
2262	4822 126 14241	0603 50V 330P COL R
2263	4822 126 13881	470pF 5% 50V
2264	4822 126 14226	82pF 5% 50V
2265	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2266	4822 126 14226	82pF 5% 50V
2267	4822 126 13881	470pF 5% 50V
2268	4822 126 14241	0603 50V 330P COL R
2269	4822 124 11947	10µF 20% 16V
2270	4822 126 14305	100nF 10% 16V
2271	4822 124 22651	1.0µF 20% 50V
2272	4822 124 22651	1.0µF 20% 50V
2273	4822 124 22651	1.0µF 20% 50V
2275	4822 126 14305	100nF 10% 16V
2276	4822 126 14305	100nF 10% 16V
2300	4822 126 14305	100nF 10% 16V
2301	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2302	4822 126 14305	100nF 10% 16V
2303	4822 124 41643	100µF 20% 16V DIM:6.3X11MM.
2304	4822 126 14305	100nF 10% 16V
2306	4822 126 14305	100nF 10% 16V
2307	5322 121 42661	330nF 5% 63V
2308	4822 124 11947	10µF 20% 16V
2309	5322 121 42661	330nF 5% 63V
2310	4822 122 31765	100pF 2% 63V
2311	4822 122 31765	100pF 2% 63V
2313	4822 122 31765	100pF 2% 63V
2314	4822 122 31765	100pF 2% 63V
2315	4822 126 14305	100nF 10% 16V
2316	4822 126 14305	100nF 10% 16V
2317	5322 121 42661	330nF 5% 63V
2318	5322 121 42661	330nF 5% 63V
2319	4822 122 31765	100pF 2% 63V
2320	4822 122 31765	100pF 2% 63V
2321	4822 126 14305	100nF 10% 16V
2332	4822 126 14305	100nF 10% 16V
2333	4822 124 22339	100UE 16V
2334	4822 124 22339	100UE 16V
2335	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2336	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2337	4822 126 14305	100nF 10% 16V
2338	4822 126 14305	100nF 10% 16V
2339	4822 126 14305	100nF 10% 16V
2340	4822 126 14305	100nF 10% 16V
2400	4822 126 14305	100nF 10% 16V
2401	4822 126 14305	100nF 10% 16V
2402	4822 126 14305	100nF 10% 16V
2403	4822 126 14305	100nF 10% 16V
2404	4822 126 14305	100nF 10% 16V
2405	4822 126 14305	100nF 10% 16V
2406	4822 126 14305	100nF 10% 16V
2407	4822 126 14305	100nF 10% 16V
2408	5322 121 42661	330nF 5% 63V
2409	4822 126 14305	100nF 10% 16V
2410	4822 122 31765	100pF 2% 63V
2411	4822 122 31765	100pF 2% 63V
2412	4822 126 14305	100nF 10% 16V
2413	4822 121 42408	220nF 5% 63V
2414	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2415	4822 124 22339	100UE 16V
2416	4822 126 14305	100nF 10% 16V
2417	4822 126 14305	100nF 10% 16V
2441	4822 126 14305	100nF 10% 16V
2500	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2501	4822 126 14305	100nF 10% 16V
2502	4822 126 14305	100nF 10% 16V
2503	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2504	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2505	4822 126 14305	100nF 10% 16V
2506	3198 017 44740	0603 10V 470nF COL
2508	4822 124 40184	1000µF 20% 10V
2516	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2517	4822 124 11947	10µF 20% 16V
2518	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2519	4822 124 41643	100µF 20% 16V DIM:6.3X11MM
2528	4822 126 13883	220pF 5% 50V
2529	4822 126 13883	220pF 5% 50V
2530	4822 126 13883	220pF 5% 50V
2531	3198 016 36810	0603 25V 680P COL R
2532	4822 126 13883	220pF 5% 50V
2533	4822 126 14494	22nF 10% 25V
2534	4822 126 14494	22nF 10% 25V
2535	4822 126 13883	220pF 5% 50V
2536	4822 124 11947	10µF 20% 16V
2537	4822 126 14305	100nF 10% 16V
2538	4822 122 33777	47pF 5% 63V
2540	4822 122 33777	47pF 5% 63V
2541	4822 126 13883	220pF 5% 50V
2542	4822 124 80231	47µF 20% 16V
2543	4822 124 80231	47µF 20% 16V
2544	4822 124 80231	47µF 20% 16V
2545	4822 124 80231	47µF 20% 16V
2546	5322 126 11583	10nF 10% 50V
2549	4822 124 80791	470µF 16V 20% 105C DXH=8X11.5
2550	4822 124 80791	470µF 16V 20% 105C DXH=8X11.5
-▭-		
3100	4822 051 30101	100Ω 5% 0.062W
3101	4822 051 30109	10Ω 5% 0.062W
3102	4822 051 30101	100Ω 5% 0.062W
3103	4822 051 30101	100Ω 5% 0.062W
3104	4822 051 30101	100Ω 5% 0.062W
3105	4822 051 30101	100Ω 5% 0.062W
3106	4822 051 30105	1M 5% 0.062W
3107	4822 051 30101	100Ω 5% 0.062W
3108	4822 051 30101	100Ω 5% 0.062W
3109	4822 051 30101	100Ω 5% 0.062W
3110	4822 051 30223	22k 5% 0.062W
3111	4822 051 30472	4k7 5% 0.062W
3112	4822 051 30472	4k7 5% 0.062W
3113	4822 051 30472	4k7 5% 0.062W
3114	4822 051 30472	4k7 5% 0.062W
3115	4822 051 30479	47Ω 5% 0.062W
3116	4822 051 30479	47Ω 5% 0.062W
3118	4822 051 30479	47Ω 5% 0.062W
3120	4822 051 30472	4k7 5% 0.062W
3121	4822 051 30472	4k7 5% 0.062W
3122	4822 051 30223	22k 5% 0.062W
3123	4822 051 30472	4k7 5% 0.062W
3124	4822 051 30221	220Ω 5% 0.062W
3125	4822 051 30008	0Ω jumper
3127	4822 051 30479	47Ω 5% 0.062W
3128	4822 051 30479	47Ω 5% 0.062W
3129	4822 051 30479	47Ω 5% 0.062W
3130	4822 051 30479	47Ω 5% 0.062W
3131	4822 051 30479	47Ω 5% 0.062W
3132	4822 051 30472	4k7 5% 0.062W
3135	4822 051 30008	0Ω jumper
3136	4822 051 30332	3k3 5% 0.062W
3137	4822 051 30332	3k3 5% 0.062W
3138	4822 051 30332	3k3 5% 0.062W
3140	4822 051 30332	3k3 5% 0.062W
3148	4822 051 30272	2k7 5% 0.062W
3149	4822 051 30101	100Ω 5% 0.062W
3150	4822 051 30472	4k7 5% 0.062W
3200	4822 051 30103	10k 5% 0.062W
3201	5322 117 13034	1k5 1% 0.063W
3203	4822 117 13632	100k 1% 0.62W
3204	4822 117 12891	220k 1% ERJ3Ω
3205	4822 051 30102	1k 5% 0.062W
3207	4822 051 30332	3k3 5% 0.062W
3208	4822 051 30472	4k7 5% 0.062W
3209	4822 051 30151	150Ω 5% 0.062W
3210	4822 117 12706	10k 1% 0.063W
3211	5322 117 13028	12k 1% 0.063W
3212	5322 117 13028	12k 1% 0.063W
3213	4822 117 12706	10k 1% 0.063W
3214	5322 117 13028	12k 1% 0.063W
3215	4822 051 30222	2k2 5% 0.062W
3216	4822 051 30472	4k7 5% 0.062W
3217	4822 051 30223	22k 5% 0.062W
3218	4822 051 30102	1k 5% 0.062W
3219	4822 051 30223	22k 5% 0.062W
3220	5322 117 13028	12k 1% 0.063W
3221	4822 117 12706	10k 1% 0.063W
3222	5322 117 13028	12k 1% 0.063W
3223	5322 117 13028	12k 1% 0.063W
3224	4822 117 12706	10k 1% 0.063W
3225	5322 117 13028	12k 1% 0.063W
3226	5322 117 13028	12k 1% 0.063W
3227	4822 117 12706	10k 1% 0.063W
3228	4822 117 12706	10k 1% 0.063W
3229	5322 117 13033	15k 1% 0.063W
3230	5322 117 13028	12k 1% 0.063W
3231	4822 117 12706	10k 1% 0.063W
3232	4822 117 12706	10k 1% 0.063W
3233	5322 117 13033	15k 1% 0.063W
3234	5322 117 13028	12k 1% 0.063W
3235	4822 117 12706	10k 1% 0.063W
3236	4822 117 12706	10k 1% 0.063W
3237	5322 117 13033	15k 1% 0.063W
3238	5322 117 13028	12k 1% 0.063W
3239	4822 117 12706	10k 1% 0.063W
3240	4822 117 12706	10k 1% 0.063W
3241	5322 117 13033	15k 1% 0.063W
3242	5322 117 13028	12k 1% 0.063W
3243	4822 117 12706	10k 1% 0.063W
3244	4822 117 12706	10k 1% 0.063W
3245	5322 117 13033	15k 1% 0.063W
3246	5322 117 13028	12k 1% 0.063W
3247	4822 117 12706	10k 1% 0.063W
3248	4822 117 12706	10k 1% 0.063W
3249	5322 117 13033	15k 1% 0.063W
3250	5322 117 13028	12k 1% 0.063W
3251	4822 117 12706	10k 1% 0.063W
3252	4822 117 12706	10k 1% 0.063W
3253	5322 117 13033	15k 1% 0.063W
3254	5322 117 13028	12k 1% 0.063W
3255	4822 117 12706	10k 1% 0.063W
3256	4822 117 12706	10k 1% 0.063W
3257	5322 117 13033	15k 1% 0.063W
3258	5322 117 13028	12k 1% 0.063W

3259	5322 117 13037	2k2 1% 0.063W
3260	5322 117 13018	1k0 1% 0.063W
3261	4822 051 30479	47Ω 5% 0.062W
3262	4822 051 30151	150Ω 5% 0.062W
3263	4822 051 30479	47Ω 5% 0.062W
3267	4822 051 30109	10Ω 5% 0.062W
3268	4822 051 30109	10Ω 5% 0.062W
3269	4822 051 30109	10Ω 5% 0.062W
3270	4822 051 30109	10Ω 5% 0.062W
3271	4822 051 30109	10Ω 5% 0.062W
3272	4822 051 30109	10Ω 5% 0.062W
3273	4822 051 30151	150Ω 5% 0.062W
3274	4822 117 12139	22Ω 5% 0.062W
3275	4822 117 12903	1k8 1% 0.063W
3276	4822 117 12903	1k8 1% 0.063W
3277	4822 117 12903	1k8 1% 0.063W
3278	4822 117 12903	1k8 1% 0.063W
3279	5322 117 13028	12k 1% 0.063W
3280	5322 117 13028	12k 1% 0.063W
3281	5322 117 13028	12k 1% 0.063W
3282	5322 117 13028	12k 1% 0.063W
3283	5322 117 13028	12k 1% 0.063W
3284	5322 117 13028	12k 1% 0.063W
3285	5322 117 13028	12k 1% 0.063W
3286	5322 117 13028	12k 1% 0.063W
3287	5322 117 13018	1k0 1% 0.063W
3288	4822 051 30273	27k 5% 0.062W
3289	4822 051 30472	4k7 5% 0.062W
3290	4822 117 12968	820Ω 5% 0.62W
3291	4822 051 30472	4k7 5% 0.062W
3300	4822 051 30472	4k7 5% 0.062W
3301	4822 051 30223	22k 5% 0.062W
3304	4822 051 30392	3k9 5% 0.063W
3306	4822 051 30109	10Ω 5% 0.062W
3307	4822 051 30273	27k 5% 0.062W
3309	4822 051 30392	3k9 5% 0.063W
3310	4822 051 30471	470Ω 5% 0.062W
3311	4822 051 30272	2k7 5% 0.062W
3312	4822 051 30471	470Ω 5% 0.062W
3313	4822 051 30272	2k7 5% 0.062W
3314	4822 051 30103	10k 5% 0.062W
3315	4822 051 30103	10k 5% 0.062W
3316	4822 051 30471	470Ω 5% 0.062W
3317	4822 051 30272	2k7 5% 0.062W
3320	4822 051 30471	470Ω 5% 0.062W
3321	4822 051 30272	2k7 5% 0.062W
3322	4822 051 30103	10k 5% 0.062W
3323	4822 051 30103	10k 5% 0.062W
3326	4822 051 30392	3k9 5% 0.063W
3330	4822 051 30471	470Ω 5% 0.062W
3331	4822 051 30272	2k7 5% 0.062W
3333	4822 051 30392	3k9 5% 0.063W
3335	4822 051 30471	470Ω 5% 0.062W
3336	4822 051 30272	2k7 5% 0.062W
3337	4822 051 30103	10k 5% 0.062W
3338	4822 051 30103	10k 5% 0.062W
3341	4822 051 30109	10Ω 5% 0.062W
3342	4822 051 30109	10Ω 5% 0.062W
3345	4822 051 30109	10Ω 5% 0.062W
3346	4822 051 30109	10Ω 5% 0.062W
3400	4822 051 30472	4k7 5% 0.062W
3401	4822 051 30472	4k7 5% 0.062W
3402	4822 051 30472	4k7 5% 0.062W
3403	4822 051 30472	4k7 5% 0.062W
3404	4822 051 30472	4k7 5% 0.062W
3405	4822 051 30472	4k7 5% 0.062W
3407	4822 051 30392	3k9 5% 0.063W
3410	4822 051 30471	470Ω 5% 0.062W
3411	4822 051 30222	2k2 5% 0.062W
3412	4822 051 30272	2k7 5% 0.062W
3413	4822 051 30472	4k7 5% 0.062W
3414	4822 051 30222	2k2 5% 0.062W
3415	4822 051 30471	470Ω 5% 0.062W
3416	4822 051 30272	2k7 5% 0.062W
3417	4822 051 30103	10k 5% 0.062W
3418	4822 051 30103	10k 5% 0.062W
3422	4822 051 30109	10Ω 5% 0.062W
3426	4822 051 30109	10Ω 5% 0.062W
3427	4822 051 30472	4k7 5% 0.062W
3428	4822 117 13632	100k 1% 0.62W
3429	4822 051 30472	4k7 5% 0.062W
3430	4822 117 13632	100k 1% 0.62W
3431	4822 051 30472	4k7 5% 0.062W
3432	4822 117 13632	100k 1% 0.62W
3433	4822 051 30472	4k7 5% 0.062W
3434	4822 117 13632	100k 1% 0.62W
3435	4822 051 30472	4k7 5% 0.062W
3436	4822 117 13632	100k 1% 0.62W
3500	4822 051 30759	75Ω 5% 0.062W
3501	4822 051 30759	75Ω 5% 0.062W
3502	4822 051 30759	75Ω 5% 0.062W
3503	4822 051 30759	75Ω 5% 0.062W
3505	4822 117 11151	1Ω 5%
3507	4822 051 30223	22k 5% 0.062W
3508	4822 051 30222	2k2 5% 0.062W
3509	4822 051 30223	22k 5% 0.062W
3516	4822 051 30153	15k 5% 0.062W
3517	4822 051 30103	10k 5% 0.062W
3518	4822 117 11151	1Ω 5%
3519	4822 117 11151	1Ω 5%
3523	4822 051 30759	75Ω 5% 0.062W
3524	4822 051 30759	75Ω 5% 0.062W
3525	4822 051 30759	75Ω 5% 0.062W
3526	4822 051 30759	75Ω 5% 0.062W
3527	4822 051 30101	100Ω 5% 0.062W
3528	5322 117 13037	2k2 1% 0.063W
3529	5322 117 13037	2k2 1% 0.063W
3530	4822 051 30759	75Ω 5% 0.062W
3531	5322 117 13018	1k0 1% 0.063W
3532	5322 117 13018	1k0 1% 0.063W
3533	4822 051 30109	10Ω 5% 0.062W
3534	5322 117 13034	1k5 1% 0.063W
3535	4822 117 12968	820Ω 5% 0.62W
3536	5322 117 13037	2k2 1% 0.063W
3537	5322 117 13018	1k0 1% 0.063W
3538	5322 117 13018	1k0 1% 0.063W
3539	5322 117 13036	1k2 1% 0.063W
3540	4822 051 30759	75Ω 5% 0.062W
3541	4822 051 30759	75Ω 5% 0.062W
3542	4822 051 30561	560Ω 5% 0.062W
3543	5322 117 13031	5k6 1% 0.063W
3544	4822 051 30689	68Ω 5% 0.063W
3545	4822 051 30101	100Ω 5% 0.062W
3546	4822 051 30101	100Ω 5% 0.062W
3550	5322 117 13018	1k0 1% 0.063W
3551	4822 117 12902	8k2 1% 0.063W
3552	5322 117 13018	1k0 1% 0.063W
3553	4822 051 30759	75Ω 5% 0.062W
3554	4822 051 30759	75Ω 5% 0.062W
3555	4822 051 30759	75Ω 5% 0.062W
3556	4822 051 30759	75Ω 5% 0.062W

5201	2422 535 94092	IND FXD SM 0805 33U PM10 R
5202	2422 535 94092	IND FXD SM 0805 33U PM10 R
5203	2422 535 94092	IND FXD SM 0805 33U PM10 R
5501	4822 242 10756	DSS306-92Y5S221M100
5503	2422 535 94092	IND FXD SM 0805 33U PM10 R
5504	2422 535 94092	IND FXD SM 0805 33U PM10 R
5506	4822 157 70601	100µH (920927085A)
5507	2422 535 94092	IND FXD SM 0805 33U PM10 R
5508	2422 535 94092	IND FXD SM 0805 33U PM10 R
5509	4822 157 11074	100µH

6300	4822 130 11397	BAS316
6506	4822 130 11522	UDZ15B
6507	4822 130 11522	UDZ15B
6508	4822 130 11522	UDZ15B

7100	9965 000 06673	TC7WHU04FU
7101	9965 000 06673	TC7WHU04FU
7103	9352 499 60118	IC SM 74LVC00AD (PHSE) R
7104	9352 499 60118	IC SM 74LVC00AD (PHSE) R
7105	4822 209 17441	74LVC74AD
7106	4822 209 17455	74LVC157AD
7107	5322 209 11578	PCF8574T
7120	4822 130 60511	BC847B
7122	9965 000 04199	BSN20
7123	9965 000 04199	BSN20
7126	4822 130 60511	BC847B
7200	9965 000 06675	CS4397 24BIT 192KHZ DAC
7201	9322 171 68668	IC SM CS4392-KZ (CILO) R
7202	9322 171 68668	IC SM CS4392-KZ (CILO) R
7203	9322 124 43668	IC SM LM317MDT (ST00) R
7204	9322 179 99668	IC SM OPA2228U (BBOO) R
7205	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7206	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7220	4822 130 60511	BC847B
7221	4822 130 60511	BC847B
7222	4822 130 60511	BC847B
7224	5322 130 60845	BC807-25
7225	4822 130 60511	BC847B
7300	5322 209 14481	HEF4053BT
7302	4822 209 30095	LM833D
7304	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7305	9322 067 00668	IC SM OP275GS (ANA0) R
7306	5322 209 14481	HEF4053BT
7307	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7320	4822 130 42804	BC817-25
7321	4822 130 60511	BC847B
7322	4822 130 42804	BC817-25
7323	4822 130 42804	BC817-25
7324	4822 130 42804	BC817-25
7325	4822 130 42804	BC817-25
7326	4822 130 42804	BC817-25
7327	4822 130 42804	BC817-25
7400	5322 209 14481	HEF4053BT
7401	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7402	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7403	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7404	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7408	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7420	4822 130 42804	BC817-25
7421	4822 130 42804	BC817-25
7500	9322 165 60668	IC SM LA7109 (TSAJ) R
7503	4822 209 17398	LD1117DT33
7504	9322 141 80668	AD8073JR
7520	4822 130 60511	BC847B
7521	4822 130 60511	BC847B
7522	4822 130 60511	BC847B
7604	9322 155 28667	OPT FIB CON GP1FA550TZ (SRPJ)L

Prog Scan DVD962SA /171 /691

Various

1002	2422 025 14349	CON BM H 22P F 1.00 FFC 0.3 R
1003	2422 026 05191	CON BM CINCH H 3P F RDBUGN B
1200	2422 025 08149	CON BM V 6P M 2.00 PH B
1201	4822 267 10637	B5B-PH-K (5P)

2100	4822 124 40207	100µF 20% 25V
2101	4822 124 81286	47µF 20% 16V
2102	4822 124 81286	47µF 20% 16V
2103	4822 126 13879	220nF 20% 16V
2104	4822 126 13879	220nF 20% 16V
2105	4822 126 13879	220nF 20% 16V
2106	4822 126 13879	220nF 20% 16V
2107	4822 126 13879	220nF 20% 16V
2108	4822 126 13879	220nF 20% 16V
2109	4822 126 13879	220nF 20% 16V
2110	4822 126 13879	220nF 20% 16V
2111	4822 126 13879	220nF 20% 16V
2112	4822 126 13879	220nF 20% 16V
2113	4822 126 13879	220nF 20% 16V
2114	4822 126 13879	220nF 20% 16V
2115	4822 122 33741	10pF 10% 50V
2116	4822 122 33741	10pF 10% 50V
2117	4822 124 81286	47µF 20% 16V
2118	4822 126 13879	220nF 20% 16V
2119	4822 126 13879	220nF 20% 16V
2120	4822 126 13879	220nF 20% 16V
2121	4822 126 13879	220nF 20% 16V
2122	4822 126 13879	220nF 20% 16V
2125	4822 124 81286	47µF 20% 16V
2126	4822 126 14305	100nF 10% 16V
2127	4822 126 14305	100nF 10% 16V
2128	4822 126 14305	100nF 10% 16V
2129	4822 126 14305	100nF 10% 16V
2130	4822 126 14305	100nF 10% 16V
2131	4822 126 14305	100nF 10% 16V
2132	4822 126 14305	100nF 10% 16V
2133	4822 126 14305	100nF 10% 16V
2134	4822 126 14305	100nF 10% 16V
2135	4822 126 14305	100nF 10% 16V
2136	4822 126 14305	100nF 10% 16V
2137	4822 126 14305	100nF 10% 16V
2138	4822 126 14305	100nF 10% 16V
2139	4822 126 14305	100nF 10% 16V

2140	3198 017 44740	0603 10V 470nF COL
2141	3198 017 44740	0603 10V 470nF COL
2142	4822 126 14305	100nF 10% 16V
2143	4822 126 14305	100nF 10% 16V
2144	4822 126 14305	100nF 10% 16V
2145	4822 126 14305	100nF 10% 16V
2146	4822 126 14305	100nF 10% 16V
2147	4822 126 14305	100nF 10% 16V
2148	4822 126 14305	100nF 10% 16V
2149	4822 126 14305	100nF 10% 16V
2150	4822 126 14305	100nF 10% 16V
2151	4822 126 14305	100nF 10% 16V
2152	4822 126 14305	100nF 10% 16V
2153	4822 126 14305	100nF 10% 16V
2154	4822 126 14305	100nF 10% 16V
2155	4822 126 14305	100nF 10% 16V
2200	4822 124 40184	1000µF 20% 10V
2201	4822 126 14305	100nF 10% 16V
2202	4822 126 14305	100nF 10% 16V
2203	4822 124 81286	47µF 20% 16V
2204	4822 126 14305	100nF 10% 16V
2205	4822 126 14305	100nF 10% 16V
2206	4822 124 40184	1000µF 20% 10V
2207	4822 124 81286	47µF 20% 16V
2208	4822 126 14305	100nF 10% 16V
2209	4822 126 14305	100nF 10% 16V
2210	4822 124 40769	4.7µF 20% 100V
2211	4822 126 14305	100nF 10% 16V
2213	4822 126 13956	68pF 5% 63V CASE
2214	4822 122 33761	22pF 5% 50V
2215	4822 126 14507	18pF 5% 50V
2217	4822 126 14305	100nF 10% 16V
2218	4822 126 14305	100nF 10% 16V
2219	4822 126 14305	100nF 10% 16V
2220	4822 126 13956	68pF 5% 63V CASE
2221	4822 122 33761	22pF 5% 50V
2222	4822 126 14507	18pF 5% 50V
2224	4822 126 14305	100nF 10% 16V
2225	4822 126 13956	68pF 5% 63V CASE
2226	4822 122 33761	22pF 5% 50V
2227	4822 126 14507	18pF 5% 50V
2229	4822 122 31765	100pF 2% 63V
2230	4822 122 31765	100pF 2% 63V
2231	4822 122 31765	100pF 2% 63V
2232	4822 126 14305	100nF 10% 16V
2240	4822 126 14305	100nF 10% 16V
2241	4822 126 14305	100nF 10% 16V
2242	4822 126 14305	100nF 10% 16V
2243	3198 017 44740	0603 10V 470nF COL
2247	4822 122 31765	100pF 2% 63V
2249	4822 122 31765	100pF 2% 63V
2250	4822 122 31765	100pF 2% 63V
2253	4822 122 31765	100pF 2% 63V
2254	4822 122 31765	100pF 2% 63V
2255	4822 126 14305	100nF 10% 16V
2256	4822 126 14305	100nF 10% 16V
2257	4822 126 14305	100nF 10% 16V
2258	4822 126 14305	100nF 10% 16V
2259	4822 126 14305	100nF 10% 16V
2260	4822 126 14305	100nF 10% 16V
2261	4822 126 14305	100nF 10% 16V

-▭-

3100	4822 117 12139	22Ω 5% 0.062W
3101	4822 117 12139	22Ω 5% 0.062W
3102	4822 117 12139	22Ω 5% 0.062W
3103	4822 117 12139	22Ω 5% 0.062W
3104	4822 117 12139	22Ω 5% 0.062W
3105	4822 117 12139	22Ω 5% 0.062W
3106	4822 117 12139	22Ω 5% 0.062W
3107	4822 117 12139	22Ω 5% 0.062W
3108	4822 117 12139	22Ω 5% 0.062W
3109	4822 117 12139	22Ω 5% 0.062W
3110	4822 117 12139	22Ω 5% 0.062W
3111	4822 117 12139	22Ω 5% 0.062W
3112	4822 117 12139	22Ω 5% 0.062W
3113	4822 117 12139	22Ω 5% 0.062W
3114	4822 117 12139	22Ω 5% 0.062W
3115	4822 117 12139	22Ω 5% 0.062W
3116	4822 117 12139	22Ω 5% 0.062W
3117	4822 117 12139	22Ω 5% 0.062W
3118	4822 117 12139	22Ω 5% 0.062W
3119	4822 117 12139	22Ω 5% 0.062W
3120	4822 117 12139	22Ω 5% 0.062W
3121	4822 117 12139	22Ω 5% 0.062W
3122	4822 117 12139	22Ω 5% 0.062W
3123	4822 117 12139	22Ω 5% 0.062W
3124	4822 117 12139	22Ω 5% 0.062W
3125	4822 117 12139	22Ω 5% 0.062W
3126	4822 117 12139	22Ω 5% 0.062W
3127	4822 117 12139	22Ω 5% 0.062W
3128	4822 117 12139	22Ω 5% 0.062W
3129	4822 117 12139	22Ω 5% 0.062W
3130	4822 117 12139	22Ω 5% 0.062W
3131	4822 117 12139	22Ω 5% 0.062W
3132	4822 117 12139	22Ω 5% 0.062W
3133	4822 117 12139	22Ω 5% 0.062W
3134	4822 117 12139	22Ω 5% 0.062W
3135	4822 117 12139	22Ω 5% 0.062W
3136	4822 117 12139	22Ω 5% 0.062W
3137	4822 117 12139	22Ω 5% 0.062W
3138	4822 117 12139	22Ω 5% 0.062W
3139	4822 117 12139	22Ω 5% 0.062W
3140	4822 117 12139	22Ω 5% 0.062W
3141	4822 117 12139	22Ω 5% 0.062W
3142	4822 117 12139	22Ω 5% 0.062W
3143	4822 117 12139	22Ω 5% 0.062W
3144	4822 117 12139	22Ω 5% 0.062W
3145	4822 117 12139	22Ω 5% 0.062W
3146	4822 117 12139	22Ω 5% 0.062W
3147	4822 051 30472	4k7 5% 0.062W
3148	4822 051 30472	4k7 5% 0.062W
3149	4822 051 30472	4k7 5% 0.062W
3150	4822 051 30472	4k7 5% 0.062W
3151	4822 051 30472	4k7 5% 0.062W
3152	4822 051 30472	4k7 5% 0.062W
3153	4822 051 30472	4k7 5% 0.062W
3154	4822 051 30101	100Ω 5% 0.062W
3155	4822 051 30101	100Ω 5% 0.062W
3206	4822 051 30103	10k 5% 0.062W
3210	4822 051 30472	4k7 5% 0.062W
3211	2322 704 62002	RST SM 2k PM1 R
3212	4822 051 30471	470Ω 5% 0.062W
3213	4822 117 11152	4Ω7 5%
3215	4822 051 30472	4k7 5% 0.062W
3216	4822 051 30101	100Ω 5% 0.062W
3217	4822 051 30101	100Ω 5% 0.062W
3229	4822 051 30759	75Ω 5% 0.062W
3231	5322 117 13036	1k2 1% 0.063W
3232	5322 117 13036	1k2 1% 0.063W
3233	5322 117 13036	1k2 1% 0.063W
3234	5322 117 13036	1k2 1% 0.063W
3235	5322 117 13036	1k2 1% 0.063W
3236	5322 117 13036	1k2 1% 0.063W
3237	4822 051 30759	75Ω 5% 0.062W
3238	5322 117 13036	1k2 1% 0.063W
3239	5322 117 13036	1k2 1% 0.063W
3240	5322 117 13036	1k2 1% 0.063W
3241	5322 117 13036	1k2 1% 0.063W
3242	5322 117 13036	1k2 1% 0.063W
3243	5322 117 13036	1k2 1% 0.063W
3246	4822 051 30759	75Ω 5% 0.062W
3247	5322 117 13036	1k2 1% 0.063W
3248	5322 117 13036	1k2 1% 0.063W
3249	5322 117 13036	1k2 1% 0.063W
3250	5322 117 13036	1k2 1% 0.063W
3251	5322 117 13036	1k2 1% 0.063W
3252	5322 117 13036	1k2 1% 0.063W
3258	4822 051 30101	100Ω 5% 0.062W
4xxx	4822 051 10008	0Ω 5% 0.25W (1206)
4xxx	4822 051 20008	0Ω 5% 0.25W (0805)

-∿-

5100	4822 157 71593	10µH 10%
5101	4822 157 71593	10µH 10%
5102	4822 157 11828	22U 20% SM 0805
5202	4822 157 11876	6.8µH 10% 0805
5203	4822 157 71593	10µH 10%
5204	4822 157 10586	2.2µH 10% 0805
5205	4822 157 11876	6.8µH 10% 0805
5206	4822 157 71593	10µH 10%
5207	4822 157 10586	2.2µH 10% 0805
5208	4822 157 11876	6.8µH 10% 0805
5209	4822 157 71593	10µH 10%
5210	4822 157 10586	2.2µH 10% 0805
5211	4822 157 11074	100µH
5212	4822 157 11074	100µH
5213	4822 157 11074	100µH
5214	4822 157 11716	BLM21P300SPT
5215	4822 157 11074	100µH
5216	4822 157 11716	BLM21P300SPT

⊗ ▭

7100	9322 169 18671	IC SM FLI2200 (SAGE) Y
7101	9322 166 71668	IC SM MT48LC2M32B2TG-6 (MRN0)R
7102	4822 209 17398	LD1117DT33
7103	9322 160 50668	IC SM LD1117DT25 (ST00) R
7200	9352 092 60118	IC SM 74LVT74DB (PHSE) R
7201	4822 209 17398	LD1117DT33
7202	9322 169 28671	IC SM ADV7196A (ANA0) Y
7204	9322 167 49685	IC SM AD8061ART (ANA0) R
7205	9322 167 49685	IC SM AD8061ART (ANA0) R
7206	9352 092 90118	IC SM 74LVT86DB (PHSE) R
7207	9322 167 49685	IC SM AD8061ART (ANA0) R

Mono PWB

Various

1001	2422 025 16957	CON BM V 24P F 1.00 FFC 0.3 R
1104	2422 025 15963	CON BM H 24P F 0.50 FFC SMD R
1106	2422 025 16158	CON BM H 8P F 1.00 FFC 0.3 R
1205	2422 540 98428	RES CER SM 8M467 CSTCC8.46MHz R
1300	2422 540 98426	RES CER SM 6MHz CSTCC6.00MHz R
1301	4822 267 51454	CONN. 11P FEMALE
1603	2422 025 16389	CON BM V 22P F 1.00 FFC 0.3 R
1604	2422 025 16388	CON BM V 16P F 1.00 FFC 0.3 R

⊣⊢

2009	4822 126 14305	100nF 10% 16V
2010	4822 126 14305	100nF 10% 16V
2011	4822 126 14305	100nF 10% 16V
2012	4822 126 14305	100nF 10% 16V
2013	4822 126 14043	1µF 20% 16V CASE
2100	2222 780 15656	16V 330nF PM10 R
2101	4822 126 14305	100nF 10% 16V
2103	4822 124 80151	47µF 16V
2104	4822 126 13193	4.7nF 10% 63V
2105	4822 122 33761	22pF 5% 50V
2107	4822 126 13956	68pF 5% 63V CASE
2108	4822 126 14315	390pF 5% 50V
2109	2020 552 95697	
2110	2222 861 15222	63V 2N2 PM5
2111	4822 126 14305	100nF 10% 16V
2112	5322 126 11578	1nF 10% 50V
2113	4822 126 14305	100nF 10% 16V
2114	4822 122 31765	100pF 2% 63V
2115	4822 126 14305	100nF 10% 16V
2116	4822 126 14305	100nF 10% 16V
2117	4822 126 14305	100nF 10% 16V
2118	3198 017 42230	0603 50V 22nF COL
2119	3198 017 42230	0603 50V 22nF COL
2120	4822 126 14305	100nF 10% 16V
2121	4822 126 13879	220nF 20% 16V
2122	3198 017 42230	0603 50V 22nF COL
2123	4822 126 14305	100nF 10% 16V
2124	4822 126 14305	100nF 10% 16V
2125	4822 126 14305	100nF 10% 16V
2126	4822 126 14305	100nF 10% 16V
2127	4822 126 14305	100nF 10% 16V
2128	4822 126 14508	180pF 5% 50V
2129	4822 126 14508	180pF 5% 50V
2130	4822 122 33761	22pF 5% 50V
2131	4822 126 14494	22nF 10% 25V
2136	4822 126 14305	100nF 10% 16V
2137	4822 126 14305	100nF 10% 16V
2138	4822 126 14305	100nF 10% 16V
2139	4822 126 14305	100nF 10% 16V
2140	4822 126 14241	0603 50V 330P COL R
2141	4822 122 33761	22pF 5% 50V
2142	5322 126 11583	10nF 10% 50V
2143	4822 126 13883	220pF 5% 50V
2144	4822 126 13883	220pF 5% 50V
2145	4822 126 13883	220pF 5% 50V
2146	4822 126 14305	100nF 10% 16V
2147	4822 126 14305	100nF 10% 16V
2200	4822 126 14494	22nF 10% 25V
2201	4822 126 14494	22nF 10% 25V
2202	4822 126 14494	22nF 10% 25V
2203	4822 126 14305	100nF 10% 16V
2204	4822 126 14305	100nF 10% 16V
2205	4822 126 14305	100nF 10% 16V
2206	4822 126 14549	33nF 16V O6O3
2207	5322 126 11578	1nF 10% 50V
2208	4822 126 14305	100nF 10% 16V
2209	4822 126 14305	100nF 10% 16V
2210	5322 126 11578	1nF 10% 50V
2212	4822 126 14305	100nF 10% 16V
2213	4822 126 14305	100nF 10% 16V
2214	3198 017 42230	0603 50V 22nF COL

2215	4822 124 23237	22µF 6.3V
2216	5322 126 11578	1nF 10% 50V
2226	4822 126 14305	100nF 10% 16V
2227	4822 126 14305	100nF 10% 16V
2228	4822 126 14305	100nF 10% 16V
2300	4822 126 14305	100nF 10% 16V
2301	4822 126 14305	100nF 10% 16V
2302	4822 126 14305	100nF 10% 16V
2303	4822 124 80349	47µF 20% 6.3V
2304	3198 017 42230	0603 50V 22nF COL
2305	3198 017 42230	0603 50V 22nF COL
2306	4822 124 23002	10µF 16V
2307	3198 017 42230	0603 50V 22nF COL
2308	4822 126 14494	22nF 10% 25V
2309	4822 126 14305	100nF 10% 16V
2310	4822 126 14305	100nF 10% 16V
2314	4822 126 14305	100nF 10% 16V
2315	4822 126 14305	100nF 10% 16V
2316	4822 126 14494	22nF 10% 25V
2317	4822 126 14494	22nF 10% 25V
2318	5322 122 33861	120pF 10% 50V
2319	4822 126 11669	27pF
2320	4822 126 14494	22nF 10% 25V
2401	4822 126 14305	100nF 10% 16V
2402	4822 126 14305	100nF 10% 16V
2403	4822 126 14305	100nF 10% 16V
2404	4822 126 14305	100nF 10% 16V
2405	4822 126 14305	100nF 10% 16V
2406	4822 126 14305	100nF 10% 16V
2407	4822 126 14305	100nF 10% 16V
2408	4822 126 14305	100nF 10% 16V
2409	4822 126 14305	100nF 10% 16V
2410	4822 126 14305	100nF 10% 16V
2411	4822 126 14305	100nF 10% 16V
2412	4822 126 14305	100nF 10% 16V
2413	4822 126 14305	100nF 10% 16V
2414	4822 126 14305	100nF 10% 16V
2418	4822 124 12095	100µF 20% 16V
2419	4822 124 80349	47µF 20% 6.3V
2420	4822 124 80349	47µF 20% 6.3V
2452	4822 126 14305	100nF 10% 16V
2454	4822 126 14305	100nF 10% 16V
2455	4822 126 14305	100nF 10% 16V
2457	4822 124 23002	10µF 16V
2458	4822 126 14305	100nF 10% 16V
2458	4822 126 14583	470nF 10% 16V XTR
2459	4822 126 14043	1µF 20% 16V CASE
2460	4822 126 14583	470nF 10% 16V XTR
2461	4822 126 14583	470nF 10% 16V XTR
2500	4822 126 14305	100nF 10% 16V
2504	4822 122 31765	100pF 2% 63V
2505	4822 126 14494	22nF 10% 25V
2506	4822 124 23002	10µF 16V
2507	4822 126 14305	100nF 10% 16V
2508	5322 126 11579	3.3nF 10% 63V
2509	4822 126 14241	0603 50V 330P COL R
2510	4822 126 14305	100nF 10% 16V
2511	4822 126 14305	100nF 10% 16V
2512	4822 126 14305	100nF 10% 16V
2513	4822 126 14305	100nF 10% 16V
2514	4822 126 14305	100nF 10% 16V
2515	4822 126 14305	100nF 10% 16V
2516	4822 126 14305	100nF 10% 16V
2517	4822 126 14305	100nF 10% 16V
2518	4822 126 14305	100nF 10% 16V
2519	4822 126 14305	100nF 10% 16V
2520	4822 126 14305	100nF 10% 16V
2521	4822 126 14305	100nF 10% 16V
2522	4822 126 14305	100nF 10% 16V
2523	4822 126 14305	100nF 10% 16V
2524	4822 126 14305	100nF 10% 16V
2525	4822 126 14305	100nF 10% 16V
2526	4822 126 14305	100nF 10% 16V
2528	4822 126 14305	100nF 10% 16V
2529	4822 126 14305	100nF 10% 16V
2530	3198 030 74780	EL SM 35V 4U7 PM20 COL R
2531	3198 030 74780	EL SM 35V 4U7 PM20 COL R
2532	4822 122 33777	47pF 5% 63V
2533	4822 122 33777	47pF 5% 63V
2534	5322 126 11578	1nF 10% 50V
2535	5322 126 11578	1nF 10% 50V
2600	4822 126 14494	22nF 10% 25V
2601	4822 126 14247	0603 50V 1N5 COL R
2602	4822 126 14247	0603 50V 1N5 COL R
2603	4822 126 14305	100nF 10% 16V
2604	4822 124 12095	100µF 20% 16V
2605	4822 126 14494	22nF 10% 25V
2606	4822 124 12095	100µF 20% 16V
2607	4822 124 12095	100µF 20% 16V
2608	4822 124 23002	10µF 16V
2609	4822 124 80151	47µF 16V
2610	4822 126 14305	100nF 10% 16V

2611	4822 124 12095	100µF 20% 16V
2614	4822 122 33777	47pF 5% 63V
2615	4822 122 33777	47pF 5% 63V
2616	4822 122 33777	47pF 5% 63V
2617	4822 122 33777	47pF 5% 63V
2620	4822 122 33777	47pF 5% 63V
2621	4822 122 33777	47pF 5% 63V
2622	4822 122 33777	47pF 5% 63V
2623	4822 122 33777	47pF 5% 63V
2624	4822 122 33777	47pF 5% 63V
2625	4822 122 33777	47pF 5% 63V
2626	4822 122 33777	47pF 5% 63V
2627	4822 122 33777	47pF 5% 63V
2632	4822 124 12095	100µF 20% 16V
2633	4822 124 12095	100µF 20% 16V
2634	4822 126 14305	100nF 10% 16V
2635	4822 126 14305	100nF 10% 16V
2636	4822 126 14305	100nF 10% 16V
2637	4822 126 14305	100nF 10% 16V
2638	4822 126 14305	100nF 10% 16V
2639	4822 126 14305	100nF 10% 16V
2646	4822 124 23002	10µF 16V
2647	4822 122 33777	47pF 5% 63V
2648	4822 122 33761	22pF 5% 50V
2649	4822 126 14305	100nF 10% 16V
2650	4822 126 14305	100nF 10% 16V
2700	4822 126 14305	100nF 10% 16V
2701	4822 126 14305	100nF 10% 16V
2702	4822 126 14305	100nF 10% 16V
2703	4822 126 14305	100nF 10% 16V
2704	4822 126 14305	100nF 10% 16V
2705	4822 126 14305	100nF 10% 16V
2706	4822 126 14305	100nF 10% 16V
2707	4822 124 80349	47µF 20% 6.3V
2800	4822 124 23002	10µF 16V
2801	4822 124 23002	10µF 16V
2802	4822 126 14305	100nF 10% 16V
2803	4822 126 14305	100nF 10% 16V
2804	4822 126 14305	100nF 10% 16V
2805	4822 126 14305	100nF 10% 16V
2806	4822 126 14305	100nF 10% 16V
2807	4822 126 14305	100nF 10% 16V
2808	4822 126 14305	100nF 10% 16V
2809	4822 126 14305	100nF 10% 16V
2810	4822 126 14305	100nF 10% 16V
2811	4822 126 14305	100nF 10% 16V
2812	4822 126 14305	100nF 10% 16V
2813	4822 126 14305	100nF 10% 16V
2814	4822 126 14305	100nF 10% 16V
2815	4822 126 14305	100nF 10% 16V
2816	4822 126 14305	100nF 10% 16V
2817	4822 126 14305	100nF 10% 16V
2818	4822 126 14305	100nF 10% 16V
2819	4822 126 14305	100nF 10% 16V
2820	4822 126 14305	100nF 10% 16V
2821	4822 126 14305	100nF 10% 16V
2822	4822 126 14305	100nF 10% 16V
2823	4822 124 23002	10µF 16V
2824	4822 126 14305	100nF 10% 16V
2825	4822 124 23002	10µF 16V
2826	4822 126 14305	100nF 10% 16V
2827	5322 126 11583	10nF 10% 50V
2828	4822 126 14225	56pF 5% 50V
2829	4822 126 14305	100nF 10% 16V
2830	4822 126 14305	100nF 10% 16V
2831	4822 126 14305	100nF 10% 16V
2832	4822 126 14238	0603 50V 2N2 COL R
2833	5322 126 11583	10nF 10% 50V
2834	4822 126 14305	100nF 10% 16V
2901	4822 126 14305	100nF 10% 16V
2901	5322 126 11583	10nF 10% 50V
2902	4822 126 14305	100nF 10% 16V
2903	4822 126 14305	100nF 10% 16V
2905	4822 126 14305	100nF 10% 16V
2906	4822 122 33761	22pF 5% 50V
2907	4822 122 33761	22pF 5% 50V

─▭─

3000	4822 051 30339	33Ω 5% 0.062W
3001	4822 051 30339	33Ω 5% 0.062W
3002	4822 051 30339	33Ω 5% 0.062W
3003	4822 051 30103	10k 5% 0.062W
3004	4822 051 30339	33Ω 5% 0.062W
3005	4822 051 30339	33Ω 5% 0.062W
3006	4822 051 30339	33Ω 5% 0.062W
3007	4822 051 30339	33Ω 5% 0.062W
3008	4822 051 30339	33Ω 5% 0.062W
3009	4822 051 30339	33Ω 5% 0.062W
3010	4822 117 12925	47k 1% 0.063W
3011	4822 051 30339	33Ω 5% 0.062W
3012	4822 051 30472	4k7 5% 0.062W
3013	4822 051 30103	10k 5% 0.062W
3014	4822 051 30103	10k 5% 0.062W
3015	4822 051 30103	10k 5% 0.062W
3015	4822 051 30332	3k3 5% 0.062W
3016	4822 051 30103	10k 5% 0.062W
3017	4822 051 30103	10k 5% 0.062W
3018	4822 117 12925	47k 1% 0.063W
3019	4822 051 30103	10k 5% 0.062W
3020	4822 051 30339	33Ω 5% 0.062W
3021	4822 051 30472	4k7 5% 0.062W
3022	4822 051 30472	4k7 5% 0.062W
3023	4822 051 30103	10k 5% 0.062W
3024	4822 051 30222	2k2 5% 0.062W
3025	4822 051 30103	10k 5% 0.062W
3026	4822 051 30103	10k 5% 0.062W
3027	4822 051 30103	10k 5% 0.062W
3028	4822 051 30103	10k 5% 0.062W
3029	4822 051 30472	4k7 5% 0.062W
3030	4822 051 30103	10k 5% 0.062W
3030	4822 051 30332	3k3 5% 0.062W
3031	4822 051 30103	10k 5% 0.062W
3033	4822 051 30102	1k 5% 0.062W
3100	4822 117 11152	4Ω7 5%
3102	5322 117 13034	1k5 1% 0.063W
3103	5322 117 13034	1k5 1% 0.063W
3104	5322 117 13062	390Ω 1% 0.063W
3105	4822 051 30103	10k 5% 0.062W
3106	4822 051 30479	47Ω 5% 0.062W
3107	4822 051 20228	2Ω2 5% 0.1W
3108	4822 051 20228	2Ω2 5% 0.1W
3109	4822 117 13632	100k 1% 0.62W
3110	4822 051 30479	47Ω 5% 0.062W
3111	5322 117 13058	150Ω 1% 0.063W
3112	5322 117 13021	47Ω 1% 0.063W
3114	4822 051 20228	2Ω2 5% 0.1W
3115	4822 051 20228	2Ω2 5% 0.1W
3116	5322 117 13042	3k9 1% 0.063W
3117	4822 051 30181	180Ω 5% 0.062W
3118	4822 051 30681	680Ω 5% 0.062W
3119	5322 117 13062	390Ω 1% 0.063W
3120	4822 051 30102	1k 5% 0.062W
3121	4822 051 30273	27k 5% 0.062W
3122	4822 051 30471	470Ω 5% 0.062W
3123	4822 051 30103	10k 5% 0.062W
3124	4822 051 30471	470Ω 5% 0.062W
3125	4822 051 30103	10k 5% 0.062W
3126	4822 051 30103	10k 5% 0.062W
3127	4822 051 30223	22k 5% 0.062W
3128	2322 704 69109	
3129	4822 051 30392	3k9 5% 0.063W
3130	4822 051 20228	2Ω2 5% 0.1W
3131	4822 051 20228	2Ω2 5% 0.1W
3132	4822 051 20228	2Ω2 5% 0.1W
3133	4822 051 20228	2Ω2 5% 0.1W
3134	5322 117 13047	330Ω 1% 0.063W
3135	4822 117 13613	2Ω2 5%
3137	4822 117 13613	2Ω2 5%
3138	5322 117 13053	6k8 1% 0.063W
3139	4822 117 12917	1Ω 5% 0.062W
3140	4822 051 30479	47Ω 5% 0.062W
3141	4822 117 11152	4Ω7 5%
3142	5322 117 13028	12k 1% 0.063W
3143	5322 117 13043	220Ω 1% 0.063W
3144	2322 704 69109	
3146	4822 051 30103	10k 5% 0.062W
3147	4822 051 30103	10k 5% 0.062W
3148	5322 117 13022	22k 1% 0.063W
3153	4822 117 12139	22Ω 5% 0.062W
3155	4822 051 30103	10k 5% 0.062W
3157	4822 051 30103	10k 5% 0.062W
3158	5322 117 13017	100Ω 1% 0.063W
3160	4822 051 30101	100Ω 5% 0.062W
3161	4822 117 13613	2Ω2 5%
3162	4822 051 30101	100Ω 5% 0.062W
3163	4822 051 30273	27k 5% 0.062W
3164	4822 117 13613	2Ω2 5%
3165	5322 117 13063	120Ω 1% 0.063W
3166	4822 051 30393	39k 5% 0.062W
3167	4822 051 30101	100Ω 5% 0.062W
3168	5322 117 13047	330Ω 1% 0.063W
3169	4822 051 30101	100Ω 5% 0.062W
3170	4822 051 30101	100Ω 5% 0.062W
3171	4822 051 30101	100Ω 5% 0.062W
3172	4822 117 13632	100k 1% 0.62W
3173	4822 117 13632	100k 1% 0.62W
3174	4822 117 11152	4Ω7 5%
3175	4822 117 13613	2Ω2 5%
3176	4822 051 30153	15k 5% 0.062W
3178	4822 117 11151	1Ω 5%
3179	4822 051 30221	220Ω 5% 0.062W
3180	4822 117 13632	100k 1% 0.62W
3181	4822 051 30561	560Ω 5% 0.062W
3182	5322 117 13018	1k0 1% 0.063W
3183	5322 117 13017	100Ω 1% 0.063W
3184	2322 704 61204	

3185	4822 117 11151	1Ω 5%
3187	4822 051 30273	27k 5% 0.062W
3189	4822 051 30008	0Ω jumper
3190	4822 051 30008	0Ω jumper
3191	4822 051 30008	0Ω jumper
3192	4822 051 30008	0Ω jumper
3193	4822 051 30008	0Ω jumper
3194	4822 051 30008	0Ω jumper
3195	4822 051 30008	0Ω jumper
3197	4822 051 30008	0Ω jumper
3198	5322 117 13049	470Ω 1% 0.063W
3199	5322 117 13042	3k9 1% 0.063W
3200	4822 051 30103	10k 5% 0.062W
3201	4822 117 11151	1Ω 5%
3202	4822 117 11151	1Ω 5%
3203	4822 051 30105	1M 5% 0.062W
3204	4822 051 30331	330Ω 5% 0.062W
3205	4822 051 30103	10k 5% 0.062W
3206	4822 051 30103	10k 5% 0.062W
3207	4822 051 30472	4k7 5% 0.062W
3208	4822 051 30272	2k7 5% 0.062W
3209	4822 051 30472	4k7 5% 0.062W
3210	4822 051 30392	3k9 5% 0.063W
3211	4822 051 30472	4k7 5% 0.062W
3212	4822 117 11152	4Ω7 5%
3213	4822 117 11152	4Ω7 5%
3214	4822 051 30392	3k9 5% 0.063W
3215	4822 051 30103	10k 5% 0.062W
3216	4822 051 30472	4k7 5% 0.062W
3219	4822 051 30103	10k 5% 0.062W
3220	4822 051 30103	10k 5% 0.062W
3221	4822 051 30103	10k 5% 0.062W
3224	4822 051 30151	150Ω 5% 0.062W
3225	2322 704 62004	
3226	4822 051 30103	10k 5% 0.062W
3227	4822 051 30472	4k7 5% 0.062W
3229	4822 051 30123	12k 5% 0.062W
3230	4822 051 30103	10k 5% 0.062W
3231	4822 051 30103	10k 5% 0.062W
3232	4822 117 13613	2Ω2 5%
3233	4822 051 30102	1k 5% 0.062W
3234	4822 117 12902	8k2 1% 0.063W
3235	4822 117 13632	100k 1% 0.62W
3236	4822 051 30472	4k7 5% 0.062W
3237	4822 051 30103	10k 5% 0.062W
3238	4822 051 30103	10k 5% 0.062W
3239	4822 051 30008	0Ω jumper
3240	4822 051 30103	10k 5% 0.062W
3242	4822 051 30008	0Ω jumper
3243	4822 051 30008	0Ω jumper
3246	4822 051 30008	0Ω jumper
3247	4822 051 30008	0Ω jumper
3249	4822 051 30008	0Ω jumper
3250	4822 051 30008	0Ω jumper
3251	4822 051 30008	0Ω jumper
3252	4822 051 30008	0Ω jumper
3253	4822 051 30008	0Ω jumper
3254	4822 051 30008	0Ω jumper
3255	4822 051 30008	0Ω jumper
3256	4822 051 30008	0Ω jumper
3257	4822 051 30008	0Ω jumper
3258	4822 051 30008	0Ω jumper
3259	4822 117 11151	1Ω 5%
3260	4822 117 11151	1Ω 5%
3300	4822 117 11152	4Ω7 5%
3301	4822 051 30105	1M 5% 0.062W
3302	4822 051 30221	220Ω 5% 0.062W
3303	4822 051 30101	100Ω 5% 0.062W
3304	4822 051 30272	2k7 5% 0.062W
3305	4822 051 30272	2k7 5% 0.062W
3306	4822 051 30101	100Ω 5% 0.062W
3309	4822 051 30103	10k 5% 0.062W
3310	4822 051 30223	22k 5% 0.062W
3311	4822 051 30223	22k 5% 0.062W
3312	4822 051 30472	4k7 5% 0.062W
3313	4822 051 30472	4k7 5% 0.062W
3316	4822 051 20108	1Ω 5% 0.1W
3317	4822 051 20108	1Ω 5% 0.1W
3318	4822 051 30472	4k7 5% 0.062W
3319	4822 051 30479	47Ω 5% 0.062W
3320	4822 051 30472	4k7 5% 0.062W
3321	4822 051 30682	6k8 5% 0.062W
3322	5322 117 13026	4k7 1% 0.063W
3323	5322 117 13026	4k7 1% 0.063W
3324	4822 117 13632	100k 1% 0.62W
3325	4822 051 30682	6k8 5% 0.062W
3326	4822 051 30479	47Ω 5% 0.062W
3327	4822 051 30682	6k8 5% 0.062W
3328	4822 051 30223	22k 5% 0.062W
3329	4822 051 30223	22k 5% 0.062W
3330	4822 051 30223	22k 5% 0.062W
3331	4822 051 30332	3k3 5% 0.062W
3332	4822 051 30332	3k3 5% 0.062W
3333	4822 051 30101	100Ω 5% 0.062W
3334	4822 051 30101	100Ω 5% 0.062W
3335	4822 051 30101	100Ω 5% 0.062W
3336	4822 051 30339	33Ω 5% 0.062W
3337	4822 051 30339	33Ω 5% 0.062W
3338	4822 051 30101	100Ω 5% 0.062W
3339	4822 051 30008	0Ω jumper
3340	4822 051 30008	0Ω jumper
3403	4822 051 30103	10k 5% 0.062W
3404	4822 051 30103	10k 5% 0.062W
3450	4822 051 30103	10k 5% 0.062W
3451	4822 117 13632	100k 1% 0.62W
3452	4822 051 30223	22k 5% 0.062W
3453	4822 051 30222	2k2 5% 0.062W
3454	4822 051 30223	22k 5% 0.062W
3455	4822 051 30223	22k 5% 0.062W
3455	4822 117 13632	100k 1% 0.62W
3456	4822 051 30103	10k 5% 0.062W
3457	4822 051 30103	10k 5% 0.062W
3458	4822 051 30223	22k 5% 0.062W
3459	4822 051 30223	22k 5% 0.062W
3460	4822 051 30472	4k7 5% 0.062W
3462	4822 051 30101	100Ω 5% 0.062W
3500	4822 051 30332	3k3 5% 0.062W
3501	4822 051 30332	3k3 5% 0.062W
3502	4822 051 30103	10k 5% 0.062W
3503	4822 051 30103	10k 5% 0.062W
3504	4822 051 30103	10k 5% 0.062W
3505	4822 051 30103	10k 5% 0.062W
3506	4822 051 30103	10k 5% 0.062W
3508	4822 051 30689	68Ω 5% 0.063W
3509	4822 051 30103	10k 5% 0.062W
3511	4822 051 30332	3k3 5% 0.062W
3512	4822 051 30332	3k3 5% 0.062W
3513	4822 051 30103	10k 5% 0.062W
3514	4822 051 30103	10k 5% 0.062W
3515	4822 051 30103	10k 5% 0.062W
3516	4822 051 30103	10k 5% 0.062W
3517	4822 051 30332	3k3 5% 0.062W
3519	4822 051 30103	10k 5% 0.062W
3520	4822 051 30103	10k 5% 0.062W
3521	4822 051 30103	10k 5% 0.062W
3522	4822 051 30103	10k 5% 0.062W
3523	4822 051 30332	3k3 5% 0.062W
3524	4822 051 30101	100Ω 5% 0.062W
3525	4822 051 30103	10k 5% 0.062W
3526	4822 051 30103	10k 5% 0.062W
3534	4822 051 30103	10k 5% 0.062W
3535	4822 051 30153	15k 5% 0.062W
3537	4822 051 30331	330Ω 5% 0.062W
3538	4822 051 30681	680Ω 5% 0.062W
3541	4822 051 30479	47Ω 5% 0.062W
3542	4822 051 30479	47Ω 5% 0.062W
3545	4822 051 30221	220Ω 5% 0.062W
3546	4822 051 30101	100Ω 5% 0.062W
3548	4822 051 30008	0Ω jumper
3550	4822 051 30101	100Ω 5% 0.062W
3551	4822 051 30101	100Ω 5% 0.062W
3564	4822 051 30008	0Ω jumper
3570	4822 051 30101	100Ω 5% 0.062W
3571	4822 051 30689	68Ω 5% 0.063W
3572	4822 051 30689	68Ω 5% 0.063W
3605	4822 051 30008	0Ω jumper
3606	4822 117 12925	47k 1% 0.063W
3607	4822 117 13632	100k 1% 0.62W
3608	4822 117 13632	100k 1% 0.62W
3609	4822 117 13632	100k 1% 0.62W
3610	4822 051 30103	10k 5% 0.062W
3611	4822 051 30103	10k 5% 0.062W
3612	4822 051 30103	10k 5% 0.062W
3613	4822 051 30103	10k 5% 0.062W
3614	4822 051 30103	10k 5% 0.062W
3615	4822 051 30103	10k 5% 0.062W
3616	4822 051 30103	10k 5% 0.062W
3618	4822 051 30223	22k 5% 0.062W
3619	4822 051 30223	22k 5% 0.062W
3620	4822 051 30101	100Ω 5% 0.062W
3621	4822 051 30101	100Ω 5% 0.062W
3622	4822 051 30101	100Ω 5% 0.062W
3623	4822 051 30339	33Ω 5% 0.062W
3624	4822 051 30339	33Ω 5% 0.062W
3625	4822 051 30339	33Ω 5% 0.062W
3626	4822 051 30102	1k 5% 0.062W
3627	4822 051 30471	470Ω 5% 0.062W
3628	4822 051 30471	470Ω 5% 0.062W
3629	4822 051 30472	4k7 5% 0.062W
3630	4822 051 30221	220Ω 5% 0.062W
3631	2322 704 64301	RST SM 430Ω PM1 R
3632	2322 704 64301	RST SM 430Ω PM1 R
3633	2322 704 64301	RST SM 430Ω PM1 R
3635	4822 051 30682	6k8 5% 0.062W
3636	4822 051 30682	6k8 5% 0.062W
3637	4822 051 30332	3k3 5% 0.062W
3642	4822 051 30103	10k 5% 0.062W
3647	2322 704 64301	RST SM 430Ω PM1 R
3648	2322 704 64301	RST SM 430Ω PM1 R
3651	2322 704 64301	RST SM 430Ω PM1 R
3654	2322 704 64301	RST SM 430Ω PM1 R
3655	2322 704 64301	RST SM 430Ω PM1 R
3656	2322 704 64301	RST SM 430Ω PM1 R
3657	2322 704 64301	RST SM 430Ω PM1 R
3658	4822 051 30102	1k 5% 0.062W
3659	4822 051 30102	1k 5% 0.062W
3660	4822 051 30102	1k 5% 0.062W
3661	2322 704 64301	RST SM 430Ω PM1 R
3662	4822 051 30102	1k 5% 0.062W
3663	4822 051 30102	1k 5% 0.062W
3664	2322 704 64301	RST SM 430Ω PM1 R
3665	4822 117 12139	22Ω 5% 0.062W
3667	4822 051 30339	33Ω 5% 0.062W
3672	4822 051 30479	47Ω 5% 0.062W
3686	4822 051 30223	22k 5% 0.062W
3687	4822 051 30223	22k 5% 0.062W
3688	4822 051 30472	4k7 5% 0.062W
3689	4822 051 30223	22k 5% 0.062W
3691	4822 051 30339	33Ω 5% 0.062W
3702	4822 051 30102	1k 5% 0.062W
3800	4822 051 30479	47Ω 5% 0.062W
3801	4822 051 30339	33Ω 5% 0.062W
3802	4822 051 30331	330Ω 5% 0.062W
3805	4822 051 30479	47Ω 5% 0.062W
3806	4822 051 30153	15k 5% 0.062W
3807	4822 051 30682	6k8 5% 0.062W
3808	4822 051 30332	3k3 5% 0.062W
3809	4822 051 30332	3k3 5% 0.062W
3810	4822 051 30332	3k3 5% 0.062W
3811	4822 051 30332	3k3 5% 0.062W
3812	5322 117 13042	3k9 1% 0.063W
3813	5322 117 13042	3k9 1% 0.063W
3814	4822 051 30181	180Ω 5% 0.062W
3814	4822 051 30339	33Ω 5% 0.062W
3815	4822 051 30561	560Ω 5% 0.062W
3816	4822 051 30101	100Ω 5% 0.062W
3900	4822 051 30103	10k 5% 0.062W
3901	4822 051 30103	10k 5% 0.062W
3902	4822 051 30339	33Ω 5% 0.062W
3903	4822 051 30339	33Ω 5% 0.062W
3904	4822 051 30331	330Ω 5% 0.062W
3904	4822 051 30339	33Ω 5% 0.062W
3905	4822 051 30221	220Ω 5% 0.062W
3906	4822 051 30339	33Ω 5% 0.062W
3907	2322 704 65609	RST SM 56Ω PM1 R
3907	4822 051 30339	33Ω 5% 0.062W
3908	4822 051 30339	33Ω 5% 0.062W
3908	4822 051 30479	47Ω 5% 0.062W
3909	4822 051 30332	3k3 5% 0.062W
3910	2322 704 65609	RST SM 56Ω PM1 R

—∿—

5000	4822 157 11717	BLM31P500SPT
5200	4822 157 11717	BLM31P500SPT
5300	4822 157 11717	BLM31P500SPT
5301	4822 157 11717	BLM31P500SPT
5402	4822 157 11717	BLM31P500SPT
5403	4822 157 11499	BLM11P600SPT
5450	4822 157 11717	BLM31P500SPT
5501	4822 157 70299	2.2µH (NL322522T-2R2J)
5502	4822 157 70299	2.2µH (NL322522T-2R2J)
5503	4822 157 71206	BLM21A601SPT
5504	4822 157 71206	BLM21A601SPT
5600	4822 157 71206	BLM21A601SPT
5601	4822 157 11499	BLM11P600SPT
5602	4822 157 10547	15µH 5%
5604	4822 157 10547	15µH 5%
5605	4822 157 10547	15µH 5%
5606	4822 157 10547	15µH 5%
5607	4822 157 10547	15µH 5%
5608	4822 157 10547	15µH 5%
5609	4822 157 11717	BLM31P500SPT
5610	4822 157 11717	BLM31P500SPT
5611	4822 157 11717	BLM31P500SPT
5700	4822 157 11717	BLM31P500SPT
5800	4822 157 11717	BLM31P500SPT
5801	4822 157 11717	BLM31P500SPT
5802	4822 157 11717	BLM31P500SPT
5900	4822 157 11717	BLM31P500SPT
5901	4822 157 11717	BLM31P500SPT
5902	4822 157 11717	BLM31P500SPT
5903	4822 157 11717	BLM31P500SPT

—▶|—

6200	4822 130 11397	BAS316
6301	9322 128 69685	S1D
6302	9322 128 69685	S1D
6303	9322 128 69685	S1D

6600	4822 130 11528	1PS76SB10

7000	9337 144 60118	IC SM 74HCT4066D (PHSE) R
7001	4822 130 60373	BC856B
7002	5322 130 60159	BC846B
7003	5322 130 60159	BC846B
7004	5322 130 60159	BC846B
7005	5322 130 60159	BC846B
7006	5322 130 60159	BC846B
7007	5322 130 60159	BC846B
7100	5322 130 42718	BFS20
7101	5322 130 42718	BFS20
7102	9352 637 37518	TZA1033HL
7103	4822 209 17229	BA5938FM
7104	4822 209 30095	LM833D
7105	4822 209 32073	MC34072D
7106	5322 130 42718	BFS20
7107	4822 209 33411	MC78L05ACD
7108	5322 130 60845	BC807-25
7109	4822 209 15083	AN78M09
7109	9322 136 29668	L78M09CDT
7110	5322 130 60803	BST72A
7111	5322 130 60159	BC846B
7112	5322 130 60159	BC846B
7113	5322 130 60159	BC846B
7114	5322 130 60159	BC846B
7115	4822 130 60373	BC856B
7116	5322 130 60159	BC846B
7117	4822 130 42804	BC817-25
7201	9351 869 80118	74HCT573DB
7202	3104 123 85860	AM29F002T/5.1.14
7203	4822 130 60373	BC856B
7204	9322 139 67685	IC SM MC33464N-45A (MOTA) R
7207	9352 636 60557	SAA7399HL/M2A
7304	4822 209 16877	BA6856FP
7304	9322 139 85668	BA6665FM
7310	4822 209 15899	CY7C199-15C
7311	9352 637 83557	IC SM SAA7335HL/E/M2 (PHSE) Y
7312	4822 130 60373	BC856B
7315	5322 130 60159	BC846B
7400	9352 499 60118	IC SM 74LVC00AD (PHSE) R
7401	3104 123 86520	AM29LV160DT-90EC/V0.78
7402	4822 209 16318	MC33464N-30A
7404	9322 144 59668	IC SM MT48LC1M16A1TG-7S (MRN)R
7405	9322 144 59668	IC SM MT48LC1M16A1TG-7S (MRN)R
7451	3104 123 86520	AM29LV160DT-90EC/V0.78
7452	5322 130 60159	BC846B
7453	5322 130 60159	BC846B
7454	5322 130 60159	BC846B
7455	4822 130 60373	BC856B
7503	9322 151 16671	STI5505AVC
7505	4822 209 17377	M24C32-WMN6/PROG
7505	8204 056 05580	M24C32-WMN6TNKSA
7600	5322 209 71568	PC74HCT14T
7604	5322 130 60159	BC846B
7605	4822 209 17398	LD1117DT33
7607	5322 130 60159	BC846B
7608	4822 130 60373	BC856B
7609	4822 130 60373	BC856B
7610	5322 130 60159	BC846B
7611	9352 456 80115	
7612	5322 130 60159	BC846B
7613	5322 130 60159	BC846B
7614	5322 130 60159	BC846B
7615	5322 130 60159	BC846B
7617	5322 130 60159	BC846B
7618	5322 130 60159	BC846B
7620	4822 130 60373	BC856B
7621	4822 130 42804	BC817-25
7622	4822 209 17398	LD1117DT33
7700	9322 144 96668	IC SM MT48LC4M16A2TG-8E (MRN)R
7800	9352 680 19557	SAA7331HL/M1
7801	5322 130 42718	BFS20
7802	9352 611 78118	74HC1GU04GW
7900	4822 209 90752	74HCT04D
7902	9322 153 36668	IC SM ICS302M-3 (ICSI) R
7903	9322 151 72668	IC SM ICS601M-01T (MICL) R
7905	9322 151 71668	IC SM MK2703STR (MICL) R